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A VERTEBRATE FAUNA

OF

THE MORAY BASIN

BY

J. A. HARVIE-BROWN, F.R.S.E., F.Z.S.

MEMBER OF THE BRITISH ORNITHOLOGISTS' UNION, ETC.

AND

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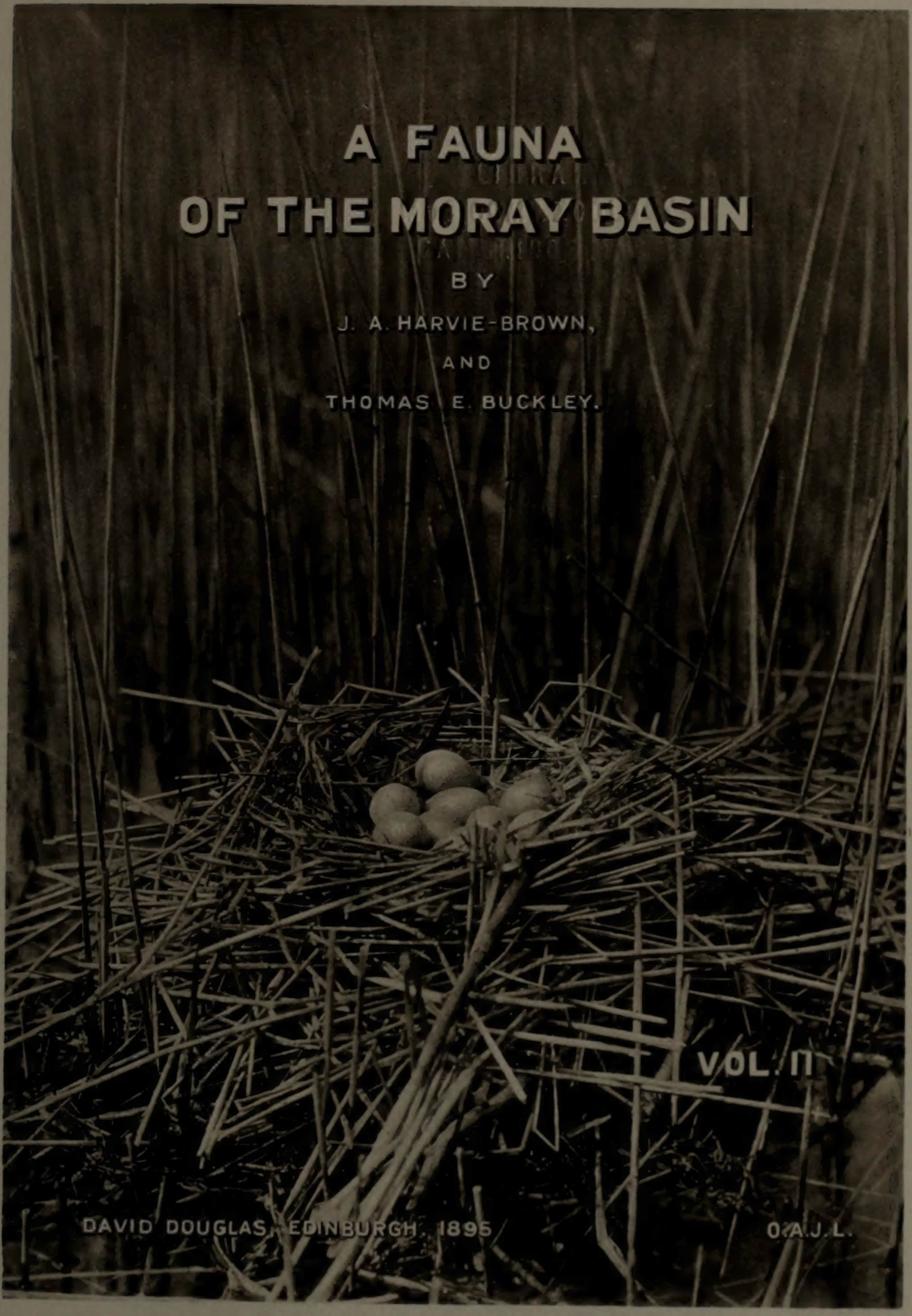

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THOMAS E. BUCKLEY.

VOL. II

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O.A.J.L.

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Class 2. AVES—*Continued.*

Family **STURNIDÆ.**

Agelaius phœniceus (*L.*). Red-winged Starling.

An accidental visitant. Gray records only one instance of its occurrence in Scotland. He says:—'A specimen which was shot near Banff in 1866 by H. A. Rannie, Esq. of Greenlaw, Corr. Member of the Natural History Society of Glasgow, and sent by him for exhibition to one of the Society's meetings in the same year. It appeared to be a young male.' Edward has it:—'A pretty bird, which occasionally visits this country.'

Sturnus vulgaris, *L.* Starling.[1]

Local Name.—Stirlin' (Gregor).

The Starling is still increasing and extending its breeding range in the north of our area. Pairs frequent all sorts of out-of-the-way houses, and in 1884 a pair took up their abode at Badenloch and bred, occasionally falling down the chimneys in the early morning, to the dismay of those into whose rooms they intruded themselves. They are occasionally seen on migration near there. As a rule, however, they keep mostly to the coast-line, where they are now very numerous.

In the northern parts of our area Starlings never, to our knowledge, occur in those numerous flocks which are so common in many parts of England. Although increasing as a breeding species, the greater part migrate south in the autumn.

Starlings are rather local, and take some time to make up their minds whether to build in a locality or not. They occur at Guisachan. At Invergarry, Mr. G. Malcolm informs us, under date 1892, that 'eight years or so they were unheard of in the glen, but now they come regularly and make their nests in some half-dozen different houses.' Farther up Glen Garry they are rare, but Captain Ellice informs us that he saw half a dozen one day in October at Ardochy, three-parts of the way up Loch Garry. Mr. Craig mentions they bred at Balmacaan, and though not very numerous were increasing (1882).

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[1] We desire to draw attention to a more detailed account of 'The Starling in Scotland: its Increase and Distribution,' by one of the present writers, in the *Annals of Scottish Natural History*, January 1895, accompanied by a map.

In the south of our area, in St. John's time, Starlings were constant inhabitants of Moray (1847), breeding about Gordonstown and Elgin Cathedral, collecting into enormous flocks and roosting in the reeds about Loch Spynie.

It is interesting to trace the records of this species in Scotland. The *O.S.A.* gives Kirkhill in the north-west as a locality, but, for reasons already stated, this is not of much positive or negative value alone, though possibly of some value if taken in conjunction with other and later records. Edward says:—'Rapidly increasing of late years; at one time single Starlings were rarely to be seen.' Now it is included in all lists. It is very abundant over all reaches of the Deveron valley in summer, but they flock and leave the upper districts at the end of summer or autumn. For instance, in 1890 only one was 'found dead' at Cabrach, and in August 1891 none were seen there, but in 1892, at the same time of year, flocks were seen in company with Lapwings even higher up in the haughs of the Upper Cabrach (*i.e.* over the 1000 feet contour). The date of their departure from the hill districts varies in different seasons, and they were later than usual in 1891. Dr. J. O. Wilson tells us that 'Starlings are very abundant, but have become so about Huntly only within the last twenty years.' All our present-day records show universality of distribution and ever-increasing spread and increase year by year.

In 1891 many bands of Starlings were already on the move, and as early as July 14th this was very patent to the careful observer in the valleys of our area. Thus, they were observed flying with steady purpose *down* the Spey at Kingussie in 1884, *down* the Spey at Lynwilg in small flocks on July 24th, 1891; *down* the Findhorn and Dulnan rivers at Tomatin and Carr Bridge, in July of the same year.

To return to the earlier records:—As early as 1844 it is stated in the *Fauna of Moray* that Starlings are 'seen almost every year in small flocks of from four to eight in the spring and autumn, and even sometimes in December. A few like a brood has been the only indication of their breeding in this part of Scotland.' These notes are of considerable interest. In 1845, however, in the *New Statistical Account* of the parish of Ardersier, Starlings were recorded as having nested in the churchyard there on the 5th June 1841. The fact is mentioned in connection with certain meteorological observations which are given (*New Statistical Account*, vol. xiv. p. 464), and mentions Starlings as having 'hatched young broods in the neighbourhood of the same parish' as an uncommon circumstance (*op. cit.* p. 466).

The *Fauna of Moray* (1889 edition) says that 'a few (two on one occasion and three on another) were seen in the midst of a very severe snowy and frosty season—viz., December 1878.' When Captain Dunbar-Brander was a young man the Starling was so scarce that its appearance was mentioned in the papers and birds were sent to the stuffer. Now, there are thousands sleeping every night in the reeds of Loch Spynie, but mostly disappearing in winter. It is spoken of as formerly rare at Abernethy, but is now common and breeding freely. 'In 1851 the Starlings have been most abundant, and continue longer than hitherto observed to do. Some people imagine, with a degree of probability, that they have been delayed by the abundance of a small caterpillar, *Plutilla cruciferarum*, which attacked in incredible numbers the turnips, and afforded ample food for these birds' (Rev. W. Forsyth, *in lit.* and *vivâ voce*).

Starlings are certainly now—or have been of late years—invading even the clearances and crofting lands amongst the pine forests. On 9th May 1892 we saw several pairs near Loch Garten, and were informed by Mr. E. Collie that several pairs had, *within the last few years*, taken possession of old Woodpeckers' holes at the back of Carnacnuic (or *Carnacruinch*, as pronounced). It is also invading Glen More, and has become common of late years at Glen More Lodge. So these and Jackdaws are penetrating even into the pine woods.

By 1893 the increase became startlingly patent, and the bird is now literally swarming over all the ground already spoken of, and has reached Inchrory on the Avon, where a few pairs nested in the house, and others in hollow birch-trees in Glen Avon (Hinxman).

Under date of May 17th, 1895, Brown, writing from Forres, says that 'the Starling is increasing at a fearful rate.'

In the face of this abnormal or extraordinarily rapid increase and extension, we feel ourselves at the last gasp of hope that the Great Spotted Woodpecker will ever return and gain possession of its old haunts. However little the Starling may have had to do with their banishment, we fear that, by sheer force of numbers and aggressiveness, they will oust or prevent re-occupancy by the woodpeckers.

The Starling is an interesting and sprightly bird, but his enormous increase, there can be little doubt, has been caused by human agency to a large extent, his own force of character and 'fitness,' cosmopolitan assurance and ability, enabling him to succeed like his relatives—the Rooks, Crows, and Jackdaws. General favourite though he be, it is, in our opinion, a question whether his good qualities may not be found wanting in the balance of good and evil, a result following upon the force of his numbers and degree of his assertiveness.

White Starlings are occasionally seen. Two, both young birds, were obtained near Forres, and passed into the collection of the late Macpherson-Grant.

Pastor roseus (*L.*). Rose-coloured Starling.

In the north of our area one was obtained near Dunrobin in 1884, and Gray remarks that this species has occurred near Dingwall in several instances. One figures in Macleay's ledgers as having been obtained at Fort Augustus on August 18th, 1855. Another was sent to Snowie the following year.

St. John shot a Rose-coloured Pastor at Loch Spynie on June 21st, 1851, apparently an adult; it was flying in company with two other Starlings. In that year several others were obtained in various parts of our island (*Zoologist*, 3233).

Edward says:—'This is another rare beauty occasionally seen in the county' of Banff. (It can only be said to present rare beauty in the adult stage of plumage.) One bird was reported to Mr. George Sim of Aberdeen as having been shot at Banff, and this, no doubt, is the original record—or the origin of the record —of 'one near Banff' (Edward, *Zoologist*, p. 310, June 1866).

Family **CORVIDÆ**.

Pyrrhocorax graculus (*L.*). **Chough.**

Booth mentions that a Chough was shot with a rifle-bullet in Glen Cannich; it was said that at that time they frequented the glen, but the date of their departure is not known.

Gray appears to have credited the earlier reports of the presence of the Chough as far north on the east coast of Scotland as Troup Head. He adds, however:—'Indeed, it may be questioned if a single Chough has been seen at either Troup Head or St. Abb's for the last ten or fifteen years.' A. G. More gives its distribution then as far north as 'Sutherland.' Sim, commenting upon Gray's remark, says:—'Gray might have said thirty or forty years, if, indeed, ever there,' an opinion we are quite inclined to indorse.

Nucifraga caryocatactes (*L.*). **Nutcracker.**

We have no other record of this species in the whole of our district than the one that was killed at Invergarry, Inverness-shire, in October 1868, and which was sent to Macleay for preservation (*auct.* W. Macleay).

Garrulus glandarius (*L.*). **Jay.**

We have very few records of Jays having been found north of the Great Glen. Gray, in his *Birds of the West of Scotland*, says that he was informed of their being found at times in Glengarry by the Rev. Mr. Stewart of Ballachulish. Mr. A. Craig, in his *Birds of Glen Urquhart*, says that 'specimens shot on the estate are to be seen at Balmacaan House, the residence of the proprietor, the Earl of Seafield.'

The late W. Macleay, of Inverness, wrote us:—'The Jay is considered a *rara avis* in Inverness-shire. I have been in business here over twenty years, and, so far as I know, only three specimens have been got. Two of these were killed ten years ago in Glen Urquhart, on the north bank of Loch Ness. (May not these be the ones referred to as above by Mr. Craig?) The third was killed last year at Grantown, Strathspey. I never heard of one being seen north of Inverness or in this neighbourhood' (W. Macleay, *in lit.* to J. Lumsden, Esq., 19th January 1875).

Captain Stirling, in his list of birds from Fairburn, enters it on the authority of a friend, who says that one specimen was shot near there.

Since Macleay wrote the above, two more specimens have passed through his hands: one was procured at Rosemarkie, in the Black Isle, in February 1881, and the other at Aldourie in December 1882.

In the south of our area the Jay is equally rare. St. John does not mention it at all as occurring in Morayshire.

James Lumsden, Esq. of Arden, Alexandria, Dumbartonshire, in his paper on the 'Distribution of the Common Jay in Scotland' (*Scottish Naturalist*, vol. ii. p. 234), quotes Edward's record (List of the Birds of Banffshire, *Zool.* 1856, p. 5273), and then adds:—'All he had heard of himself was a pair seen in the neighbourhood of Banff in the summer of 1872, which fact,' he adds, 'was recorded in a local paper'!

MacGillivray's old record still holds good generally:—'In the woods skirting the Grampians from Forfar to Dumbarton' (Lumsden's paper, *op. cit.* p. 1); but beyond this barrier or great geological fault we have little evidence of its occurrence to the northward.

Two were seen and one shot at Gordon Castle, March 14th, 1874, and another one was shot afterwards at Innes House. They were at first tame, and were supposed to be the same birds that had escaped from Dunrobin Castle (John Webster, *in lit.* to Rev. Dr. George Gordon, *Fauna of Moray*, q.v.). There were said to be eggs in Mr. Stuart's collection at Grantown, and the note is added, 'but seen very rarely.' We did not see these eggs when we inspected the collection in 1892.

Pica rustica (*Scop.*). Magpie.

Local Names.—Pyot (Gregor), Magpie (general).

In the north-east of our area the Magpie is decreasing, and we have not seen one north of the Little Ferry for many years. Our Brora correspondent, however, Mr. W. Baillie, says there is a pair still about the Uppat Woods, and in 1887 they were not uncommon in the woods along the north side of the Kyle of Sutherland. They are common in the woods about Tain and neighbourhood.

The Magpie is certainly not increasing, though it may still occur in most districts suitable to it. Mr. A. MacGillivray, gamekeeper, tells us it has been seen, though very rarely, as far up Strathglass as Guisachan. It occurs about Beauly, and was seen at Loch Beneveian by Hepburn in 1847. At Invergarry it used occasionally to be seen, though apparently never very common,[1] but now, we are informed, there is not one. A few exist in the large woods in the east of Ross-shire, but they are pretty well looked after there as elsewhere. They were not uncommon about Scotsburn in 1887.

At Glen Urquhart it only occurred as a straggler, and Mr. A. Craig did not know of their having built there for many years (1882).

In the south part of our area the Magpie is sparingly distributed. It is resident; locally abundant; much persecuted by keepers on preserved grounds; not so much killed down in some quarters where game-preservation is less followed.

St. John wrote that in his time the Magpie abounded in Moray, building at times in single trees close to a farm or other house.

Edward calls it 'one of the most *bashful* of birds.'

Dr. Gordon speaks of the Magpie as less frequently seen in the vicinity of houses than formerly, and accounts for the apparent decrease by the growth and increase of plantations. They are seen generally in pairs, but at times in flocks of eighteen or twenty (*Fauna of Moray*). The *New Statistical Account* speaks of them as abundant in the parish of Kilmorack (*op. cit.* xiv. p. 365). Mr. Lewis Dunbar remembers how abundant Magpies were forty-six years ago—say 1848—in the wood which is now close to Grantown Railway Station, five or six nests being commonly found in it. Even at the present day they are spoken of as commoner there than in most parts of Strathspey. We have met with very few indeed anywhere, except in the Laigh of Moray.

Its natural dispersal would be more general and extensive, and reach farther up into the hilly districts, were it not kept in check by keepers, and it occurs rarely now as compared with formerly. It is occasionally seen above Beldornie on the Deveron, and in the neighbouring valley of the Fiddich as high as Glen Fiddich Lodge, where one is preserved in the keeper's house. A pair or two reside here and there all over the district around Huntly, Ardonald, Mealeath, Robieston, Whitehill, etc., and would be very common if not kept down, as we are informed by Dr. J. O. Wilson.

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[1] *Vide* Knox, *Autumns on the Spey*, p. 146; Vermin List.

One large wood on Lord Moray's property (unpreserved) in the Laigh of Moray, between Alves and Covesea, harbours large numbers of Magpies, where they are not disturbed. It is reported as occurring about Tomatin (Mr. M'Bean of Tomatin), and is reckoned common in Glenavon by Hinxman. Brown of Forres considers it as decreasing. We ourselves have seen very little of the Magpie except in the wood near Alves and one or two other localities. It was common in 1885 about Roseisle, about seven miles from Forres, as shown by Vermin Lists, but Captain Dunbar-Brander considers it *rare* now, in localities known to him east of Elgin.

Mr. Brown, Earlsmill, factor to Lord Moray, informs us :—'I have only seen one at Darnaway during the past twenty years. There have been no Magpies in the forest for the last thirty years. Previous to that, one of the keepers informs me he saw them in half-dozens. I cannot account for their leaving. They are numerous in the Alves woods, about eight miles from this.'

We were informed by Macleay that an albino was shot near Keith in September 1852.

Corvus monedula, *L.* Jackdaw.

Local Names.—Kae, Ka-wattie.

The Jackdaw is another species that is increasing greatly in the northern portion of our area; this we have remarked both from our own observation and that of our correspondents, and it is now extending even into the higher and wilder straths, as at the Chisholm's Pass in Glen Affric. The steep honeycombed rocks around and above the Falls of Kilmorack on the Beauly are a great breeding resort of this species, and colonies of Jackdaws are to be found almost wherever the rocks afford suitable nesting sites. We are inclined to doubt whether this increase is an unmixed blessing either to farmers or game-preservers. About Dunrobin they are kept down as much as possible, but are very abundant in the soft sandstone rocks between Brora and Loth, building in the ledges and rabbit-holes.

One curious nesting-place of the Jackdaw is (or was in 1887) the new but never finished house on the property of Shandwick near Kildary. We went through the place one day in summer after the breeding season was over. The floors were littered with nests, the birds having obtained entrance through the broken panes of glass, giving the place a look even more untidy than the state in which it had originally been left by the carpenters.

Mr. Malcolm tells us Jackdaws are commoner now than they used to be at Invergarry, and now nest on the rocks at Kylethy.

There is no mention of the species in the *O.S.A.*; Edward says it is very plentiful in Banffshire.

St. John, in 1847, remarked that the Jackdaws bred numerously in the Findhorn rocks opposite the heronry, and were continually raiding the eggs of the larger birds. They were also common at Elgin, building their nests in the ruins of the old cathedral.

In many districts south of Inverness, the Jackdaw is resident, numerous, increasing, and assertive. There are 'Colonies' in Huntly Castle ruins, in the silver firs at Rothiemay House, and indeed in every vantage-ground they can find, such as rocky scaurs, disintegrating rocks on hillsides, etc. They are abundant on Speyside, Strathspey, but have not been observed at Upper or Lower Cabrach, nor to any great extent in the Carn districts, *yet*. The species is common on the slopes of the rocky woodland above the railway tunnels at Craigellachie and near Aberlour, on the rocks below Craigellachie, and as high up Strathspey as Kingussie in the old ruinous castles, and at the pass of the Dhucraig in Upper Badenoch. High up the deeper glens of Strathavon, it is abundant at Tomintoul, in Delnabo glen. Jackdaws breed in rabbit-holes near Carron on the Spey, and in sandbanks along the rivers. In Glenlivet it is somewhat local, but breeds in the castles of Drumin, Strathavon, and Blairfindy.

In 1850 the Jackdaw is spoken of as only 'probably breeding in the north-east of our area' (*Zoologist*), but in Gordon's *Fauna of Moray* as abundant at that date; and Brown of Forres tells us it has bred in the chimneys in Forres as long as he can remember. They swarm on the slopes of the lower Findhorn.[1]

In 1885 we observed Jackdaws passing north past Dalwhinnie singly or in small companies along with rooks—June and July—and once in a flock of from twelve to fifteen.

As we are informed by Hinxman, Jackdaws came up to Inchrory from the rookery at Tomintoul in June 1893, to work the grassy limestone slopes for the larvæ of *Tipula*.

Many good naturalists question the oophilous tendencies of Jackdaws, and are inclined to defend, and even preserve them. Personally, we would as soon think of preserving Hooded Crows. True, their food consists chiefly of insects and their larvæ, worms, and parasites found on sheep, etc. etc.; but, as their attacks upon the eggs and young of other birds frequently prove (Yarrell, 4th ed., vol. ii. p. 309), they cannot be trusted. Undoubtedly it is as omnivorous as any of the tribe, and therefore very fit to take care of itself in the struggle for existence. From the fact that Jackdaws in confinement prefer, or seem to prefer, meat, may it not be inferred from their increasing numbers, and our knowledge that they are omnivorous, that, as their more natural food becomes scarce, they may take to meat, in the form of eggs, young birds, etc., until such food becomes a second nature? In excessively dry springs, such actually does take place amongst Rooks and Jackdaws, and Hooded Crows have long since asserted these abominable qualities.

We do not join in the cry against cosmopolitan 'Jack' for banishing or bullying the Chough, because 'craws dinna pike oot craws' een.' Still, in force of numbers, and the necessities of survival of an omnivorous species over one which is less so, we believe the natural outcome will be found to be affected by the differences in character of the two species. And, quite apart from their food-questions, their pilfering of other birds' materials, which cannot be denied, is the only indication of character in the Jackdaw which is not to be admired. 'Their persistence in collecting sticks' could only be exceeded by the same persistence in Mr. Jogglebury Crowdy or Roualeyn Gordon-Cumming.

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[1] See descriptive part, Journals of Harvie-Brown, 1885, p. 373.

Corvus corone, *L.* **Carrion Crow.**

Local Names of the Grey form.—Hoddie, Hoddie Craw, Headie Craw, Hithie Craw.[1]

The black form of the Crow, though by no means so abundant in the northern as in the southern parts of Moray, is by no means a rare bird, according to some of our correspondents. It is said to be common, and nests at Invergarry, and we find it recorded also from Fairburn. At Glen Urquhart it is seldom seen (A. Craig), and from the extreme north of our area we have no further news of its increase since what was recorded of it in a former volume (*Fauna of Sutherland and Caithness*, p. 147).

With reference to the identity of the two forms, which has, we think, been pretty well established by Professor Newton (Yarrell, 4th ed., pp. 274-5), it would seem that St. John was well aware of this fact (*Sport in Moray*, p. 58), for he says that he has 'killed crows of every shade of plumage, from pure black to the perfectly marked Hooded Crow, and this without reference to age or size.' He further remarks that he has seen the grey and black forms paired, but never, so far north, a pair of black ones.

In our opinion, their distinctness is not by any means proved by all the data and arguments advanced by Seebohm (Ornithology of Siberia, *Ibis*, 1878, p. 328 *et seq.*); but the significance of the distribution of the two forms in Asia, Europe, and in the British Isles ought to prove of considerable importance in an intelligent appreciation of the study of migrational phenomena.

Mr. O. A. J. Lee mentions a Hooded Crow shot near Forres that had a grey instead of a black head. Such variations, viz.:—those which show distinctly intermediate stages between the two forms, are rarer in Scotland than they are in Siberia; and the varieties which closely resemble either one parent or the other are more usual in Scotland. Surely naturalists might agree on some common name, seeing the two forms are now recognised as one and the same.

The grey form is still too abundant, despite the war that is constantly waged against it. In some places these birds keep up their numbers, if they are not actually increasing. Thus at Invergarry Captain Ellice writes us that they have increased *enormously*, and threaten to destroy the grouse altogether. In the spring of 1887 two keepers killed no less than fifty-three there in one day! In another letter the following year Captain Ellice again remarks on the very great abundance of these vermin, and says he is at his wit's end how to destroy them.

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[1] An early recognition of the identity of the two forms is instanced in the *O.S.A.* under Dumfriesshire, thus:—'Small Raven, which in this part of the country is entirely black, but is the same with the Grey or Hooded Crow of other parts of Scotland.'

On the east coast the Hooded Crow is by no means such a common species, and during a season spent at Scotsburn, in the east of Ross-shire, they were anything but abundant. We do not think they were so numerous on the east as on the west coast, or yet as in the centre of the country, though we cannot give any reason for their affecting one locality more than another.

The *O.S.A.* mentions the 'Carrion Crow' in the south-west of the area and in Argyll. Edward says: 'Both occur in about equal numbers in Banffshire.' Brown of Forres says: 'Abundant, and breeding in the forests of Darnaway, and the Hooded Crow, which I take to be one and the same species; wherever they are they pair together.'

The Carrion Crow is not abundant in Abernethy Forest—'perhaps a few pairs' (Hinxman)—and it occurs around Grantown (Macleay's lists). Both forms nest in the heronry near Tomatin, Upper Findhorn (L. M'Bean, Esq. of Tomatin). The Hooded Crow is much the more abundant form, particularly in the lower and better cultivated areas, and is very abundant in the large woods of Lower Deveron and Middle Deveron, as, for instance, about Rothiemay, Grange, and Cullen, and in the Bin Wood near Huntly, and the local keepers say in about equal numbers with the so-called Carrion Crow, or 'Corbie.' Not many are to be seen above Beldornie or in the upper reaches of Cabrach, the ground there being too well preserved, and the nesting sites in the Glen Fiddich deer-forest and Carn district not being so numerous as in most Highland estates.

The vast numbers of Hooded Crows killed all over our Scottish estates, as shown by a large number of statistics in our possession, show faint results and scarcely any decrease in succeeding years; and if this *worst of vermin* be left alone for even one season by a careless or lazy gamekeeper or trapper, their numbers are again promptly replaced from continental sources, and a corresponding decrease of grouse will occur upon any such neglected area —cause and effect distinctly traceable.

Corvus frugilegus, *L.* **Rook.**

Although the Rook is an increasing species as regards its breeding localities in the northern part of our area, still there are parts of the country wholly destitute of them, and these, too, that would appear quite suited to their requirements. Thus, after passing Erchless there is no rookery known to us farther up Strathglass, yet Guisachan would, to all appearances, be an excellent situation for one. Similarly there is no rookery at Invergarry, nor, indeed, do we know of any, after passing Dochfour, all along Loch Ness and its surrounding country.

Mr. Craig remarks also that Rooks do not build anywhere in Glen Urquhart, although a rookery existed at one time in a fir wood near Drumnadrochit, but he was unable to say whether the birds deserted it of their own free will, or whether the nests were pulled down by the people.

A curious place for a colony of Rooks is on an island on Loch Mhuilinn, eight miles up Glen Strathfarrar from Struy.

Along the east coast of Ross-shire there are few properties of any importance that are without their own contingent of Rooks, and it is unnecessary to enumerate them. In autumn, Rooks are to be seen almost everywhere, scattered over the hills, in places far remote from rookeries, or even trees; probably at this time they are attracted by the great abundance of berries and of the caterpillars that are then to be seen clinging to the heather stalks. In severe weather they often take to the sea-shore.

To the southward of Inverness the species is resident, extremely abundant, ever increasing, and becoming decidedly more and more omnivorous and destructive, and feeding more and more on food found on the surface of the ground. The following is a list of rookeries, which is simply given without full details—which latter, however, we possess from nearly all—and there are many others—rookeries of smaller population, which have for years been established all over the Moray Basin.

Commencing in the east of our district and valley of Deveron, we find large rookeries at Hatton Castle and Gask, near Turriff (Lower Deveron), and at the former place both Herons and Rooks build in the same wood. The birds are seen all over the area to Upper Cabrach, and singly in large pine woods in August. Large rookeries exist also in the Crow-wood near Huntly, and at Mayen, and again behind Huntly Lodge, and smaller ones at Lessendrum, Cobairdy, etc. To these smaller rookeries the birds pay almost daily visits in winter, but only take up sleeping quarters at the larger rookery at Huntly Lodge (Dr. J. O. Wilson).

Farther west, there are rookeries at Aberlour, about eleven years old (1888), 300 nests, and still at that time increasing, but the birds do not often roost here in winter. In Glen Fiddich there is a rookery at Kininvie, about the same size as the last mentioned. In the low lands of Speyside there are many rookeries, amongst which we may mention that at Gordon Castle as being of somewhat special interest. About forty years previous to 1885 there was an extensive rookery close to the castle, besides others within the policies. About that time, owing to harassments and harrying, they left, and for twenty-five years there were none. They came back about 1872, and have increased to some 600 nests, there being over thirty in one tree. During 1882-83-84 a good many were shot—in 1884, 2000 shot; in 1885, 1200. The rookery covers an area extending from near the Castle almost to the village of Fochabers, a few nests being also scattered in trees by the side of the river Spey. The nests are in mixed hardwoods—ash, beech, plane, elm, oak and alder, and a few in larch-trees. The birds leave the rookeries in November and return in February. There are at present no nests in the extensive pine woods on the east, south, or west.

These Gordon Castle Rooks appear to prefer the trees for breeding purposes in the following order: beech, ash, plane, elm, oak, larch, alder.

About four miles from Gordon Castle, in the fir woods of Enzie, on the farm of Tulloch and Wellheads, a large rookery has been formed during the past fourteen years, covering an extent of about four acres, with some 600 nests. This is on the lowest-lying ground, and is a residential rookery, where the birds roost in winter also. In the Covesea district and Laigh of Moray there are many colonies of 500 nests, amongst which may be mentioned one in a large pine wood by the edge of the sandhills near Burghead, where over 1000 roost in winter, and another in a pine wood on the farm of Newton Struthers, the property of Mr. George Mackessach, which overlooks the Sand Grouse- and Stockdove-haunted dunes and rabbit-warrens, besides many smaller ones too numerous to mention. Following up the Spey we find rookeries in Strathavon at Drumin, opposite Ballindalloch, in Dalrachie wood, where there were 1100 nests in 1885.

There are rookeries at Quoinchort, near Tomintoul, and at Kirkmichael, but at present none in Glenlivet (Hinxman). Thence on from Aberlour up to Grantown are numerous rookeries every few miles. Around Forres, again, besides those we have mentioned to the east of the town, viz., at Burghead and Newton Struthers, there are the following between Forres and Nairn, and in the valley of the Lower Findhorn, which are deserving of mention, being rookeries of 500 nests and upwards, viz.:—

Castle Hill, Darnaway, five years old (1881), 524 nests in hardwoods and fir; Brodie Castle, seventy years' standing, about the same number of nests—say 500—in similar woods; at Dalvey, 502 nests; Ladies' Wood, Grange, seven years old, containing 565 nests; at Novar (Munro-Fergusson), 560—they roost here, but are on the decrease; at Brodie, a thirty-year-old colony with 1714 nests in fir, and still increasing—a residential rookery; and on the same property (Innes'), at Marcasie, one fifteen years' old has about 360 nests, also in fir. The rookery on the banks of the Findhorn disappeared in 1866.

As early as 1844 many rookeries were known in Elgin and Moray, and perhaps chief among them was one at Gordonstown, in the parish of Drainie. St. John considered them extremely common in 1847; he says, 'tens of thousands.'

It seems difficult to make certain at all whether the marvellous increase of the Rook is due entirely to local congestion at older rookeries, and a natural increase and extension outwards from these old centres, or partly also to additions from continental sources, as in the case, we believe, of the Hooded Crow. There can be no doubt, assuredly, of the great annual migrations of Rooks which take place.

The Rook feeds greedily upon crowberries (*Empetrum nigrum*) on the moors and hills after the breeding season. In severe winters it becomes quite carnivorous in its diet, and in excessively dry springs feeds upon anything almost it can obtain upon the surface (see our remarks upon this lately-developed habit in our previous volume upon *Argyll*).[1] The Rooks from the adjoining glens visit the Braes of Livet and many other hill districts early in the mornings or at night, but only a few stragglers usually remain throughout the day.

On the 18th April, 1895, we were interested in watching a considerable party of Rooks busily and greedily feeding upon the swarms of 'March Browns' along the river-side, actually wading into the shallows at the edges and picking them off the water. We had never witnessed this before, at least to the same extent. The season of 1895 was a late and a very dry one, and when the corn began to show above ground, the farmers along the Deveron valley discovered large quantities of the larva of the Daddy Long-legs, or Crane-Fly (*Tipula oberacea*, L.), locally called *Tory*,[2] doing vast destruction among the roots. Yet not a Rook was seen to seek its food in these dry fields, but they crowded down by the river-side and found other food-supplies, as just mentioned. We greatly fear Mr. Rook is becoming tender and effeminate, and does not plunge his beak so much under ground as formerly, but is satisfied with more easily obtainable surface pickings.

His oophilous propensities also have become notorious, especially of late years. We do not mean to say the Rook is *over-preserved*, as his name is never mentioned in the Bird Preservation Bills, but, like some others of the genus he belongs to, he is an assertive species, and fit for the struggle for existence under very varying and different conditions, becoming more and more omnivorous, just as his natural food-supplies become scarcer owing to the increase of other species which also feed upon them, or according to the difficulty of procuring it owing to dry seasons and other causes.

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[1] A specimen showing scarcely any abrasion of the bristles of the bill, now in the Museum of Science and Art, Edinburgh, was forwarded by Harvie-Brown.

[2] The grub is also called 'Leather Jacket' (Miss Ormerod, *Manual of Injurious Insects, etc.*, p. 66, *q.v.*).

Corvus corax, *L.* **Raven.**

Were the Raven afforded protection it would soon become a fairly common bird, but except in a few places, it is killed off on every possible occasion. This is generally done as much in the sheep-farming as in the game-keeping interest, though we have often been told that as regards its destructive propensities to both classes the Raven is nowhere in comparison to the Hooded Crow. However, as it now has a bad name, the poor bird has to pay for it, and although many old nesting sites are pointed out to us on our walks through the hills, our ears are rarely gladdened by the croakings of the birds themselves around these places during the nesting season, though now and then at other times of the year, one may be heard high in air barking away, and turning on its back as it does so, in a way unknown to any other bird than itself. Ravens breed at Invergarry, amongst other places, and are not destroyed systematically there—indeed, are preserved, and as many as sixteen have been seen together. A pair built near that place in March 1888, and when visited, the nest contained five eggs; in April, finding their nest had been visited, the old birds smashed the eggs and tore up the nest. They then appear to have built three more nests in three weeks, in one of which they deposited four eggs (Murdoch Matheson).

St. John found the Raven breeding in the old eagle's nest on the Cromarty rocks, and saw the young there; but he says that it 'is now a rare bird in this immediate district' (*Sport in Moray*, p. 46).

In May, for several years previous to 1892, we have seen many Ravens on a hill near Kinbrace, Sutherland, probably migrants from the north, as now they are rare birds there in the breeding season.

In 1892 Ravens tried to build in the rocks of the Blackwater, the main branch of the Brora river, but the birds were killed and the eggs taken by the keeper; there is, however, generally a nest in the high rock over Loch Brora, almost the only one now known to us in the north-east of our present area.

South of the Great Glen the Raven is resident, or very partially vagrant. Edward says a few frequented the coast east of Banff, where they bred; and the Rev. J. Smith spoke of it as nesting regularly on the coast about 1850 (*Zoology*, 1850, p. 2913); and mentioned 'near the Bridge of Alvah' as at one time a nesting site. But of late years we cannot obtain any account of these stations ever being occupied; and Sim of Aberdeen, who knows the district intimately, does not think there are any there now. Dr. J. O. Wilson has 'never seen nor heard of a Raven near Huntly, though well acquainted with its croak.' Hinxman mentions it in his lists from Glenlivet and Strathavon as seen flying overhead; and it used to be similarly observed on the Braes of Gartly, above Strathbogie, but now rarely or never.

The Raven, however, is still not uncommon among the upper and more mountainous districts, and we have long known of their nesting-places near the upper waters of many of the streams, and of the upper waters of Spey itself; as, for instance, on the Black Rock of Loch Errochd, where Gordon-Cumming took the eaglets; at Dalhooley, on the Spey, where eagles used to breed also; besides many other Raven-rocks throughout Ben Alder deer-forest, Corrie-arder near Loch Laggan and near Loch Dubh—on The Cluny's property among the Monadhliath mountains, behind Cluny Castle. In 1891 a pair bred in a high rock about four miles from Tomatin, on the Findhorn, and in that district, and across to Dulnan, and by the side of the latter river, and again among the hills around Lochandorb, there are Raven-rocks still either inhabited occasionally or long since deserted, or in some instances taken possession of, to our knowledge, by the Peregrine Falcon.

Formerly, no doubt, Ravens were far more abundant than in later years, and as early as 1844 there were many indications of their persecution in the interests of game-preservers and sheep-farmers. Thus we find many rocks named after the Raven which have long ceased to shelter them. Ravens built much lower down the country then, as, for instance, on a high ledge of a rock on the Findhorn at Mains of Glenferness, which rock is still known as 'The Corbies' Rock,' and instances might be multiplied *ad infinitum.* They nested even as low down as the Braes of Moray, and regularly, prior to 1840, at the Ess of Glenlaterach in the parish of Birnie, as we were informed by Dr. Gordon. At the present time this noble bird is not often seen far from the higher districts, except, perhaps, now and then floating away high overhead, almost out of sight against the blue, but his wild, harsh croak sounding strangely near and loud.

If a destructive bird by nature, the numbers of his race are being kept in check. He is far less really destructive at present than his smaller cousins. We wish we had one Raven instead of every thousand Hooded Crows, or even for every ten thousand Jackdaws, or every fifty thousand Rooks; we would be inclined to make the exchange. Still, it is right they should also be kept in check.

Family **ALAUDIDÆ**.

Alauda arvensis, *L.* **Skylark.**

Local Name.—Laverock.

For some reason the Skylark, despite the strides agriculture is even yet making in many parts of the north of our area, is getting scarcer, and this we have on the authority of our correspondents and from our own observations. At Invergarry it is reported as getting scarce, as also at Guisachan, at which latter locality there is a good deal more cultivation now than formerly, notwithstanding which, the late Lord Tweedmouth informed us the Larks are not so numerous. Brown of Forres remarks that Larks are common, but getting scarcer, 'on account of partridge-netting at night.' Whether this would have any appreciable effect on their numbers we cannot say; it is more probable that they are getting scarcer there from the same causes as elsewhere. We have mentioned these three localities to show that the same thing is happening in the wilder glens as in the well-cultivated areas.

On only one occasion have we seen anything like a migration of Larks in the north. This was during the severe weather of March 1891, when, walking along the railway-line from Brora to Helmsdale, Larks were scattered everywhere, especially among the cabbage-stalks in the small garden-plots. These birds had evidently been hindered in their northern migration by intensely cold weather. At other times the Lark is a rare bird in Sutherland, being perhaps more abundant on the hillsides than in the agricultural districts.

To the more inland parts of the country at least the Lark is a summer visitant. We are informed that they arrive at Invergarry about the second week in March.

St. John remarks that Larks are most numerous in the beginning of winter, and again in February and March.

South of the Ness the species is resident and abundant, though less numerous than formerly. It is most often noticed in April, when in full song; less so later on. We suspect that changes in the styles of agriculture and husbandry are the causes of its decrease. The species is general all through the lower districts, and even up to the higher heather-line, but rarer amongst the heather tracts than in the same localities elsewhere, such as Caithness and the Outer Hebrides. Larks are fond of young open plantations of pine, three or four years old, in late summer. It has been heard singing as early as 6th February near Westerton, Huntly, in 1888 (J. O. W.).

The Lark is not common near Tomintoul in April—indeed, only one pair was seen there in 1885. On the Findhorn it is common about Tomatin: song a sort of simple recording in July. In dead of winter the birds are less often seen, and perhaps quite absent for a short time from some localities, again appearing in their old haunts about the middle of February. Though not abundant around Tomintoul in 1885, it used to be considered commoner in Glenavon and Glenlivet, where the practice of netting Partridges at night—the mesh of the nets being so small as to take Larks as well—is given as a reason for their decrease both there and in the Laigh of Moray. We do not give much credit to the popular cry against the Starling as a cause of this decrease, although its habits are somewhat allied to well-known proclivities of the modern Rook.

[Alauda arborea, *L.* Wood Lark.

The whole records of the Wood Lark in Banffshire appear to be in a perfect muddle, if we compare Gray's account (*Birds of the West of Scotland*, p. 124) with Edward's under Blackcap, and again with Rev. J. Smith's remarks (*Zoologist*, 1850, p. 2849) under Wood Lark, and again under Blackcap in the same article. Edward says he 'had seen but one of these birds in the avenue of Duff House. It was in song, and was alone at the time—May 27th, 1880.' In all cases, we believe, 'Tree Pipit' may be read for 'Wood Lark.']

Order **PICARIÆ.**

Family **CYPSELIDÆ.**

Cypselus apus (*L.*). **Swift.**

The species is common in places in the north of our area, and is occasionally seen on migration in the centre of Sutherland, though it does not breed there. Many breed under the tiles of the old curing-yards in Helmsdale (Hill), and also at Brora, where in one house a pair has bred for the last thirty years (Baillie).

Swifts are nowhere more abundant than in the town of Inverness, where they make their presence known to the most casual observer. Hepburn saw a pair cruising over Loch Beneveian, Glen Affric, in 1847, but they do not often go so far up the straths except as very casual visitants. Captain Ellice noted it as rare on Loch Garry, but lower down the glen at Invergarry they are more abundant. They also occur about the lower part of Glen Urquhart, and probably build in Balmacaan House (A. Craig); as also in the old castle of Glen Urquhart.

Swifts nestle about the Cromarty rocks, and a nest and eggs in Booth's collection were obtained in that locality in June 1869.

South of the Ness Swifts migrate in spring down the main valleys of the system of Spey, or from west to east. They are common in all the larger towns and villages, most of which in north-east Scotland have very old and very suitable church belfries and town halls wherein they can nestle. We have repeatedly observed the Swift on migration down the Spey, and that at many different points and elevations. Thus, they were seen at Aberlour, where also they breed, in May, and at Kingussie, migrating as late as June 1st, 1884. We first observed its arrival at Aberlour in 1885 on the 6th May, which was a cruelly cold and bitter day, with snow lying on Ben Rinnes. On the 15th of May of the same year eight Swifts were seen careering down the valley of Spey very high in air. As long ago as 1844 Dr. Gordon gave the 15th May as the date of its arrival at Elgin, but the dates of arrival at different places appear to vary very much, and perhaps also to have become later of late years. Brown of Forres, whose notes we have often quoted, speaks of the Swift as 'common, but not very abundant; arrives here about the 21st

May, and leaves about the end of August.' The following dates of the arrival of the same pair of Swifts at this nesting-place under the eaves of Mr. Brown's house in Forres, and within full view at short-range vision, cannot fail to prove of interest to students of migration:—In 1888 the pair arrived on May 15th, at once taking possession; in 1889 they arrived on May 20th; in 1890 upon May 20th again; in 1891 upon May 22nd; and in 1892 on 18th May.' It would almost seem that in inclement seasons the Swift hurries up to arrive at his home as quickly as possible. Is this so? and if so, is it because he spends less time in feeding and hawking for flies *en route*? This pair of Swifts, carefully observed by Mr. Brown, usually arrive at their old home between five and seven P.M. They are decidedly day travellers.

The Swift is everywhere spoken of as common, or very common. Formerly it used to build in Forres in thatched houses, and still does so, but more sparingly, for the simple reason that thatched houses are not so rife as formerly. They have, however, easily accommodated themselves to other conditions, and there is scarcely a town of any size in our area where several pairs at least may not be seen any day or evening, dashing with impetuous flight round and round the town hall or church spires. They are common in Forres, Grantown, Elgin, Dufftown, and Huntly, whilst a few may almost surely be found at the smaller villages, such as Kingussie and Aberlour. A few were observed at Findhorn Bridge in July, and also at Carr Bridge on the Dulnan, but it was not common up the Spey valley between Grantown and Kingussie. At the latter place, however, there were a good many seen hawking over the town upon the 2nd July 1891, which had certainly every appearance of having massed there from lower parts of the valley preparatory to shifting quarters, probably *via* Dalwhinnie or up the Mashie and over the passes into the west.

In some years Swifts are certainly more numerous than in others, and it has been observed by us that the larger numbers appear to arrive in the colder and less normal summers. Thus in 1892, as the latest observation of this character made by us, we found them *unusually* abundant about Huntly in the end of June—an extremely cold summer. As we know Huntly well at that season we are not likely to exaggerate the numbers seen.

On the other hand, however, in 1893 there was a decidedly earlier migration of Swifts, as with other species. We observed four at Netherdale, on the Lower Deveron, upon the 13th May—an early arrival. Afterwards Brown of Forres assured us 'his pair of Swifts' arrived at his house upon the 3rd May, whereas, as we have already seen, their usual advent takes place between the 18th and 20th, and that with great punctuality, usually between five and seven P.M.[1]

Mr. Eagle-Clarke heard one which was flying over Loch Builg (1600 feet) on a wild, stormy day in June 1893, and we have ourselves seen them at very great elevations, decidedly on passage.

The Swifts arrived in Forres on 10th May 1895.

Family **CAPRIMULGIDÆ.**

Caprimulgus europæus, *L.* Nightjar.

To the north-east of Moray the Nightjar is a variable summer migrant, possibly not so common now about Brora and in other parts of Sutherland as it was some fifteen or twenty years ago. Mr. Baillie tells us it was rare in or absent from the neighbourhood of Brora in 1890, and again in 1892, but he found a nest with two young birds, just hatched, near that place in 1891.

This is one of the birds that Hepburn was the first to notice as far north as Loch Ness in 1847. The Nightjar is now widely distributed almost everywhere throughout the north of our present area, and we have notes of its occurrence from Tain in the north all the way to Invergarry. They were very common near Scotsburn, and on several occasions we used to go out to a patch of heather near the house on a fine summer's night to hear these birds uttering their jarring note, or watch them flitting past us, often so close as almost to touch us.

The *O.S.A.* mentions the Nightjar at Kirkhill, in north-west Moray, and Colonel Thornton also includes it in his Tour. Edward says:—'Of late years appears to have become more numerous, but is still far from plentiful.' Smith speaks of it as occasional. There is a specimen in the Banff Museum. Dr. J. O. Wilson does not include it in his list of birds around Huntly, and only quotes Edward.

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[1] We have also noticed that the House Martin appears to be more abundant in the north-east of Scotland in a cold season (see under Martin).

We have not ourselves met with it anywhere either by eye or ear on the south side of the Moray Firth, but there is not a shadow of doubt as to its occurrence over all the area, and it is universally spoken of both by the names 'Nightjar' and 'Goatsucker.' We have seen the eggs in more than one local collection; those in Mr. Stuart's collection were taken by himself in Abernethy Forest, and a broken egg was found on the ground by Mr. R. Thomson of Ferness Schoolhouse, on the Findhorn. Hinxman queries it in his list from Glenlivet and Strathavon, but, as he remarks, he has not remained there long enough into the summer to make himself assured of its presence. Brown of Forres tells us it is 'generally distributed, but not very abundant,' and that 'it arrives about the end of May and leaves in September.'

It is difficult to say to what extent this species has increased in our area of late years, but we do know it has spread within our own recollection in other parts of Scotland.

Family **PICIDÆ**.

Sub-family *PICINÆ*.

Picus major, *L.* Great Spotted Woodpecker.

As either a breeding species or as a resident, the Great Spotted Woodpecker is extinct in the portion of our area north of the Ness, its visits to us now being very irregular, generally in the autumn, and varying in numbers from a regular 'visitation' to those of a 'rare bird.' One such 'visitation' took place in September 1868, when many were seen in the Ross-shire district of the Dornoch Firth by Booth.[1] To have given every instance of their occurrence, except the distribution of the 'wave,' would have served no practical end, and taken up too much space, but there are few localities where single birds have not been seen in some one year or another. What principally concerns us is about what time these birds became extinct as a resident and breeding species, and the causes that led to this.

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[1] Booth (*Rough Notes*, vol. i. p. 2, 'Great Spotted Woodpecker') mentions:—'Towards the end of September 1868 the north-east coast of Scotland was visited by a large flight of Woodpeckers, scattered birds being noticed in the district for at least ten days or a fortnight. . . . I noticed a few on the coast near Dornoch; and in the dusk of a misty evening, with the wind blowing strong from the east, I passed numbers fluttering along the sandy links, and sheltering among the rough bushes on the Ross-shire side of the Dornoch Firth. They were especially numerous along the narrow strip of land leading towards the Mickle Ferry.'

The date of their extinction seems to have been somewhere in the fifties, and they must have begun to decrease rapidly before then. In some notes lent us by Mr. Muirhead, written in 1867, he relates that 'Mr. Stewart (the head keeper at Balmacaan) tells me that long ago there used to be Woodpeckers (the Great Spotted) found in the natural woods on the banks of the loch (Ness) about Ruskich, and that their nests were sometimes got. This I have frequently heard from people who have been long in the glen (Urquhart).' Further, Mr. Muirhead says that 'M'Dougall's boy told me he had seen a Woodpecker at Ruskich to-day,' July 6th, 1867.[1]

An old keeper, Donald Gillies, who was born in Glengarry, tells us that in his young days Woodpeckers were quite common, and could be heard tapping when going through the woods or along the road, and their holes were plentiful in the old firs. The old people then also told him they were even commoner at a still earlier date. However, the usual fate befell all the old trees and large timber, and this cutting down drove all the birds away. Donald Gillies is now (1893) an old man of seventy or more, and he says it would be forty or fifty years ago since he remembers seeing and hearing the Woodpeckers.

But it is to the late Lord Tweedmouth that we are indebted for most of our notes on this bird north of the Ness. In the district of Guisachan, his Lordship's place at the head of one of the branches of Strathglass, the Woodpecker was a common species. Hugh Fraser, an old man on the property, told him it was a favourite cage-bird, and that the priest at Glassburn, about seven miles from Guisachan, taught one to perform all sorts of tricks; this was about 1840. Another old man, Roderick Macdonald, who died a few years ago aged eighty-six, used to relate that when he was a young lad, and on his way, with some others from Guisachan, to join the militia in Inverness, one of these young lads, William Macdonald of Achlair, took a young Woodpecker with him, carrying it part of the way on his shoulder. It was bought by one of the militia officers, the laird of Glengarry. Both these men, Rory and William Macdonald, said that the Red-headed Woodpecker was plentiful at that time, easy to tame, very amusing, and full of tricks.

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[1] We almost invariably find from our inquiries in Speyside that 'boys' call Creepers 'Woodpeckers,' but that old residents, who were accustomed to see true Woodpeckers, as certainly spoke of the real object of our inquiry. Confusion between Woodpecker and Creeper may have originated possibly in the Gaelic names. *Snăg* is Gaelic for Woodpecker, and means a tap or little audible knock (*fide* Macdonald). *Snàigear* is Gaelic for Creeper, from *snàig*, to creep or crawl (*auct.* Rev. W. Forsyth, D.D., Abernethy, *in lit.* March 11th, 1892). As resulting from much later inquiry in Glen Urquhart, we find the confusion perpetuated, an educated correspondent designating the bird inquired about as 'The Great Spotted Woodpecker or *Snaigear*.'

But they were extinct before Lord Tweedmouth came to Guisachan about 1850, although an odd bird may occasionally have occurred; the last, a female, was seen in December 1886, but this would no doubt be a migrant.

Whatever was the date of its extinction—and this seems to have taken place about Guisachan previous to 1850—the bird seems to have died out exceedingly quickly. Natural causes must have effected this, as they must have been extinct long before the craze for collecting birds and eggs reached to such a height as it now has. Squirrels have been blamed for killing the young and destroying the eggs, but opinion is by no means unanimous on this score. Lord Tweedmouth remarked that the Squirrels about Guisachan were a poor, shabby lot, and, being thus small, they might have entered the holes, but where the Squirrels were of the normal size this would not be easy, and it certainly would not be easy for them to turn in the holes and get out again. Nor is it certain that the entire race is carnivorous—most likely not—though individuals may be.

The cutting down of many of the large old pine forests must have struck a blow, and a severe one, at the continuous existence of the Woodpecker, and then too the forest fires that occasionally took place would further assist in the extermination of the unfortunate birds.

About the forest of Glen Affric, Hepburn wrote in the *Zoologist* for February 1848:—'Here stood one of the noblest primeval pine-forests of the north; but a company of merchants,—I believe from Norwich,—have been here, and few and sad are the memorials of the past; scattered over the rocky knolls of scanty soil, or dotting the mountain-side, with twisted stem, gnarled bark, scanty foliage, and many a scattered limb, these old trees link the past with the present.'

The old natural pines of Ruskich on Loch Ness have also disappeared.

In 1855, Lord Tweedmouth told us, there were hundreds and hundreds of white trunks of firs burnt and dying, within a mile of Guisachan House, but now, 1892, scarcely one is to be seen.

Of the disappearance of the old pines at Guisachan, it has been said by those still living, that smuggling having become common between 1840 and 1850, the smugglers—of whom Rory Macdonald, before mentioned, Lord Tweedmouth's informant, and a native of the strath, was one—used all the decayed and bored trees for their still-fires, and this the proprietors did not discourage so long as the sound trees were left alone.

Very few of these old dead pines are now to be seen at Guisachan. Lord Tweedmouth wrote us :—'There may be a dozen of the largest left between the Plodda Fall and Garvagh Bridge, but those trees must have been too large and too thick for any Woodpecker to attack for the purpose of nesting in ; all the holes, I remember, were in trees of moderate size, *i.e.* for Guisachan natives. There is still one stunted fir remaining at Plodda Fall. It has partially recovered from the burning, and has green branches. It has an elbow, and on that elbow may be seen one of the Woodpecker's nesting-holes, though gradually closing and filling up. The tree, though small, is remarkable from the elbow being at right angles with the stock, and I have noticed the boring almost from the first time I walked that way. There were many others, ordinary-sized trees, stripped of their bark by fire—of about the same girth, and all riddled with holes, but these have gradually disappeared.' Our own idea is that the extinction of the Woodpecker arose in a great measure from the disappearance of the old *dead* pines, and the greater care now taken of the vast tracts of forest land. The woods are now judiciously thinned, and any trees showing signs of decay are cut down at once. When we were at Guisachan in 1892, none of the holes we saw in the pine-trees had any depth in them, but were exactly like those in the stump represented at page 33. In none of the few dead firs left there did we see the round holes which are so common in the

Swedish forest; these would scarcely have filled up, though in a live tree this might be the case. But does the Woodpecker ever make a hole in a living fir?[1] Our idea is that the bird would be birdlimed by its own exertions, for the resin would come running out as the bird worked, and stick to its feet, bill, and feathers.

Lord Tweedmouth sent us the following notes on the habits of this bird, which we do not remember to have seen mentioned before:—'During the nut and acorn season the Woodpecker is, like all other birds at that time of year, in its pride of plumage. Until they become so they roost in leafy trees; afterwards in trees bare of leaves in preference to firs and evergreens.'

At vol. ii. p. 258 of the *Lays of the Deer Forest* the authors say that the 'northern' Woodpecker comes to breed in the spring and remains until decline of summer, and that many of the old dead firs are pierced by its holes, and they further give a short description of it. The *O.S.A.*, on the other hand, only mentions the bird as an autumn visitant. If this bird were a regularly migrating species, then this would prove a new feature in its natural history, as we have always understood that it lived all the winter in the coldest regions, except in phenomenal seasons.[2]

MacGillivray wrote of it in 1840 that it was 'in all parts rare,' though 'a permanent resident.' St. John never mentions the bird at all.

In 1843 Woodpeckers (and squirrels) were scarce in the forests of Duthil, though a great number of old trees had been bored by the birds, and in the same locality vermin of all sorts, winged and four-footed (our correspondent, Mr. W. Robertson, especially mentions the salmon-tailed gled), were in swarms, so much so that not only were white hares and grouse comparatively scarce, but 'hardly any bird could escape them.' Mr. Robertson was keeper in that locality, but was away from 1845 to 1850, when he returned, and was put in charge of the Duthil forest with a staff of keepers to help him in clearing the ground of vermin. He was there for other ten years, during which a great part of the older trees were cut down, and these too where the Woodpeckers used to breed, and never saw a single bird after the winter and spring of 1844. (In this case, then, the mere cutting down of the trees did not drive the Woodpeckers away, as they were extinct, or nearly so, before then.) As Mr. Robertson and his men were continually through the woods 'searching every place for vermin and eggs for collection,' they could hardly have escaped notice.

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[1] We photographed a section of a live tree at Dunipace, which was sent down from Strathspey for the purpose, and the gum was exuding from the holes when we did so.

[2] Not true migration in fullest sense, but revisiting the scenes of their youth, and ready to seize an opportunity of renewing their residence.

An old man, who had worked much in the forests in his youth, told the Rev. Dr. Forsyth of Abernethy that he remembers the Woodpecker as quite common. He relates also an old superstition:—The Highlanders believed that the brain was possessed of special virtue for curing epilepsy and mania, and the birds used to be killed for the purpose of extracting the brain (Rev. William Forsyth, D.D., *in lit.* 2/iii/92).

About the year 1847 or 1848 Lewis Dunbar found a nest of the Great Spotted Woodpecker in an old fir-tree about two miles distant from Carr Bridge, and not very far from the road leading to Kingussie. He writes:—'I had to widen the hole before I could get in my hand. There were four eggs in it. They were pure white, and were laid upon the dust and chips of wood about twelve inches below the hole. I gave them to a Quaker of the name of Brown, but as to his address I can give you no information, as I saw him in Inverness.'[1]

This seems to be the only authentic record of a Woodpecker's eggs having been taken in the north of Scotland.

Mr. H. Evans kindly wrote Mr. E. Brown on our behalf, and in a letter, dated March 20th, 1892, that gentleman replied:—'My father's collection of birds' eggs is in my possession, and it contains three eggs of the Great Spotted Woodpecker, which, however, have no marks that would identify them as being the clutch in question. I should doubt if the three were out of the same nest. The skins were sold to Mr. Walter Lyn (?), and I delayed replying to your letter until I had seen this gentleman. He tells me that he did not have any eggs from my father, and I do not think myself that the collection was ever broken. Still, of course, a clutch such as you mention might have been given away.'

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[1] Mr. Edwin Brown was the name of the gentleman to whom L. Dunbar gave the nest of Woodpecker's eggs taken by him near Carr Bridge in (about) 1847. Mr. Brown was manager of the principal bank in Burton-on-Trent, and has been succeeded by his son. Our friend Mr. H. Evans, lessee of Jura deer-forest, knew him very well. He only remembers the entomological part of his (Mr. Brown's) collection, which, however, is still in existence.

Mr. Lewis Dunbar also, in one of his letters to us, speaks of two or three pairs of Great Spotted Woodpeckers breeding in the old woods of Crannach, Glenmore, Glenfeshie, and the upper woods of Abernethy; but as he left the country in 1853 he can say nothing about the birds in that quarter since.

Booth writes (*Rough Notes*, vol. i.) that, 'According to the statements of my informants, it appears that these Woodpeckers commenced to decrease in numbers about 1845 or 1850. In many parts of the country only an occasional straggler was seen for nearly thirty years. I discovered, however, in passing through several of these localities in 1878 and 1879, that a few pairs had lately taken up their quarters in their long-deserted haunts. The cause of their disappearance, in the first instance, was perfectly unaccountable to all those with whom I conversed on the subject. It does not appear, however, from the foregoing, that Booth *actually took* or even *saw* a nest.

Dr. Gordon, in his *Fauna of Moray*, states that 'two specimens were procured in 1838 by Mr. Wink from the woods of Castle Grant, which it has long been known to inhabit.' Dr. Gordon, writing to Harvie-Brown later, adds:—'I can well recollect that Mr. Wink, when I asked him, had no doubt of getting specimens from the gamekeeper, which he did.'

During the breeding season of 1867-68 Gray examined specimens shot in the counties of Banff, Aberdeen, and Inverness.[1]

Of late years there has been evidence of the occasional reappearance of the birds in their old haunts, and of their lingering far on into the breeding season. Of their occurrence in autumn and winter in droves we have many seasons' records. Indeed, all our own records since we began to pay attention to the fauna of our present area relate to these autumnal migrations, except on one occasion, when Harvie-Brown's mother saw a bird on May 15th, 1884, between Aberlour and Carron, in Strathspey, 'about the size of a Blackbird, which flew across the road, and alighted on the bark of a tree, and began climbing up spirally.' She further described it as 'spotted with white,' and as 'having some red about the head'; the bird was not more than half the breadth of the road from her.

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[1] *Birds of the West of Scotland*, p. 190.

In a letter written to Dr. Gordon by the Rev. W. Forsyth he says that 'the Great Spotted Woodpecker is not extinct yet. They have been seen occasionally in this neighbourhood within the last few years, and they have been known to build on the Nethy in the old fir woods within the last two years' (*in lit.* 8th May 1885).

This, as well as another statement that the birds bred within the last twenty years in the hole of a birch-tree, we have been unable to verify. It is probable that these two statements came from the same source.

In 1892 we are however once more confronted with a positive and often-repeated assurance that a pair of Great Spotted Woodpeckers were distinctly seen by the head-forester on the Countess of Seafield's properties in 1890. Our informant assured us that—'I saw two Woodpeckers hammering on an old blasted pine.' He spoke most positively, and added, 'It was known to several others around.' Dr. Forsyth repeated the same information, and seemed convinced of the fact; and it must be remembered how often the statement has been reiterated. Our informant also said that there are more old stocks around the localities he named than anywhere else in the forests. He told us also that he once sawed an old stock lengthways, and assured us that he found the remains of old (?) nests in it. He was also at the cutting of the piece of pine sent to Dunipace by orders of the head wood manager. He thinks these birds in 1892 had removed still farther back towards the base of the hills.

Again, the same statement is accentuated by Mr. J. Grant-Thompson, who on questioning the same witness was again assured of the fact. 'He saw them the year before last' (*i.e.* 1890)—naming the locality; and he also affirms that a pair were seen the same year at another locality by another witness, naming locality and witness's name. For evident reasons we decline to make these particulars too public. Nearly all other persons examined agreed in its absolute disappearance, but then none of these, perhaps, have so good opportunities of observation as the present witness.[1]

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[1] As we are informed by Mr. J. Grant Thompson, the old pines at the localities

In 1893 we again had the same statements repeated. We endeavoured to visit the locality named, but without a guide. We completely lost our way, taking the wrong side of a hill, and failed to find the keeper's house until the day was far spent. Mr. Norrie, however, went back, even at that late hour, and over very heavy ground, and took a photo of that portion of the old forests in which some very ancient 'roy' and bleached pines and many prostrate giants are prominent. There is also a small heronry in the same place.

If the Woodpecker does still actually remain and breed during occasional years, it must be left for younger and more active naturalists to search for the last representatives of the indigenous Great Spotted Woodpeckers of Scotland.[1]

That squirrels eat eggs occasionally, and possibly even young birds, seems to have been pretty conclusively proved; but that they, in the first instance, had much, if anything, to do with the extinction of the Woodpecker we can hardly believe. Mr. Robertson of Carr Bridge, whom we have before quoted, says that the squirrels were as scarce as the Woodpeckers in 1843, and a squirrel would be less likely to hunt about for the rare chance of falling upon a Woodpecker's nest than to seek for its more natural and more plentiful food. Whatever made the birds so scarce in the first instance (between 1840 and 1850 seems to be the date of their extinction), the cutting down of the old trees, on the one hand, would destroy the nesting and feeding grounds of the Woodpeckers, while the planting and the very rapid growth of the young firs would afford extra feeding and shelter to the squirrels.

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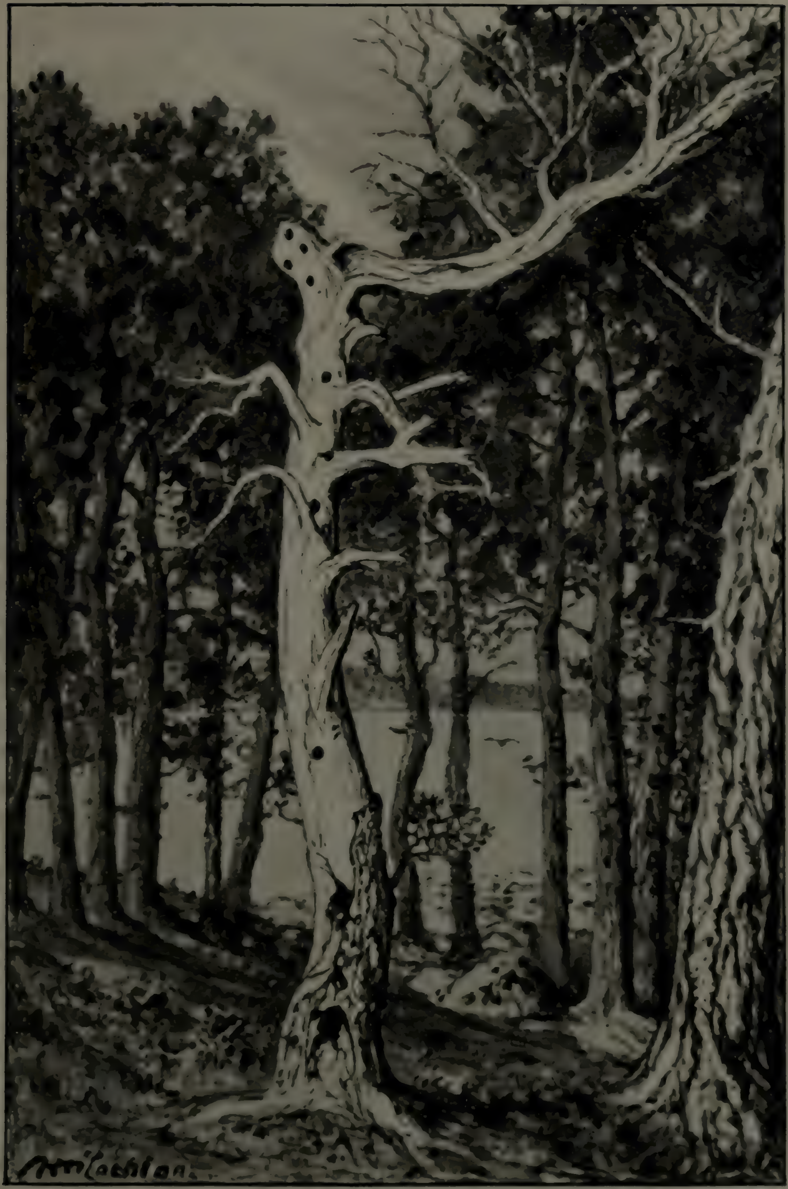
referred to were cut in 1858 or 1859. Two hundred and twenty-one of the really old pines were sold to a timber-merchant. These were standing along the side of the river and scattered over the adjacent ground. Since that time, about twenty-eight or thirty years ago (say 1860 or 1861), a large number of trees were felled, but they were of a much younger age. 'It is difficult,' says Mr. Thompson, 'to state the exact acreage of ground covered with timber in the Abernethy district, but we are certain there are several thousands of acres.'

[1] But even as we wrote the above sentences we heard of a resuscitation of the Woodpecker to the south-east of Scotland, as related in detail by Mr. Bolam in the Proceedings of the Berwickshire Naturalists' Club, birds actually having bred there, to Mr. Bolam's own knowledge. This affords evidence of an increase from south to north by natural and direct extension; at least there is no evidence to show it results from east to west migration, although we do occasionally have irruptions of the species from eastern sources.



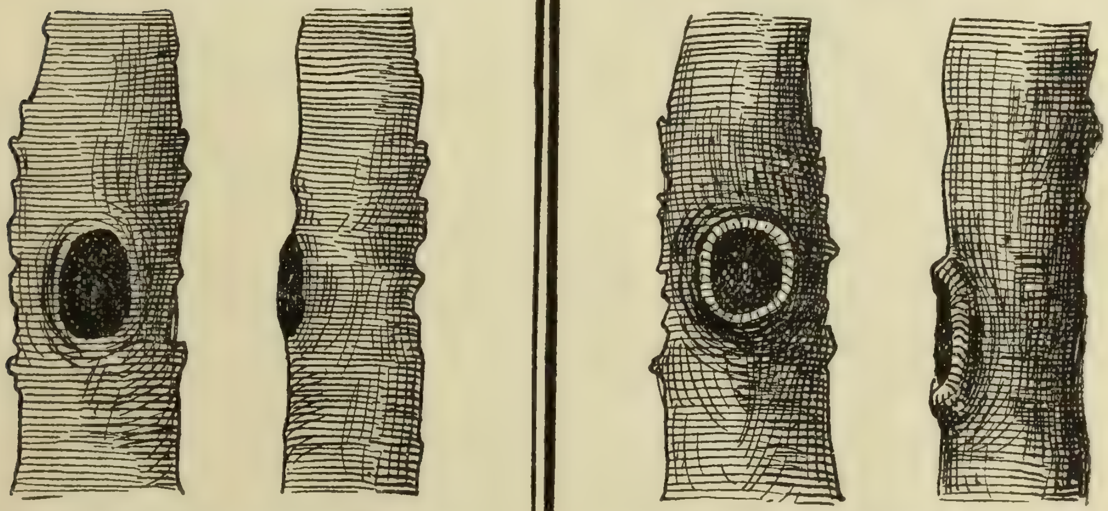
OLD BORINGS OF GREAT SPOTTED WOODPECKER AT LOCH MORLICH,
IN DECAYED PINE.

Were the facts, which we have endeavoured to arrange in a comprehensive form, not so well known and so frequently vouched for, a doubt in some people's minds might easily arise, viz., 'Are not many of these holes made by man in order to obtain the resinous gum from the pines?' But the answer is decidedly 'No,' because the Woodpecker's holes are oval, those of an auger round. Nesting-holes at the present day are sometimes—especially during late years—occupied by Starlings, even far up among the old woods, a considerable distance from dwellings.

Woodpeckers, however, will, we believe, occupy and extend other holes, such as those made by an auger, or such as are formed by decay where a dead branch has fallen away, and we know also that Woodpeckers will endeavour to bore into pines which are still full of resin, as we have ourselves seen. The holes caused by decay are usually different in appearance from those made by the birds,

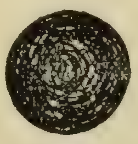
BORINGS.

Woodpecker. Old Branch.

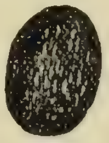


The trunk being dead or dying when bored; the hole being oval.

The trunk being live wood when the branch died and fell out; the hole being round, as a rule, but may be oval.



Auger Hole.



Woodpecker's Hole.

however, as perhaps the woodcuts in the text may better explain than words, the bark growing again round the orifice where a dead branch has fallen from a living trunk, but *rarely* so where the birds have pierced the bark of a dead or dying tree, even though resin should still exude.

Such holes may at a little distance at times be easily mistaken, but nearer the bark rim of the former can usually be easily seen, with or without the aid of binoculars.

[Picus minor (*L.*). Lesser Spotted Woodpecker.

Edward notes one shot at Meyen on the Deveron, and sent to him, and another was seen on the Lodge Hills. These are all that were known to him; and we cannot find another record.]

Sub-family *IŸNGIDÆ.*

Iÿnx torquilla, *L.* Wryneck.

A rare visitant to our present area. A specimen was sent in to Macleay of Inverness for preservation on September 8th, 1884, by Sheriff Mackenzie of Tain. St. John mentions having seen it in the woods of Dulsie; and Captain Stirling, younger of Fairburn, on the authority of a friend, says that it has occurred on one occasion only in his district.

The *O.S.A.* is silent as to any occurrence of the Wryneck in Moray. The earliest record we have is found in Mr. Hoy's MS., as follows: 'One shot at Gordon Castle by the Duke, January 12th, 1814.' The late Professor MacGillivray informed Edward of one taken at or near Portsoy by a friend of his. One, now in the Banff Museum, was taken six years ago, about fourteen miles from the town. This specimen, or another, is still in the Museum. In 1853 Edward acknowledges receipt, amongst other things, of a Wryneck from E. Newton (*in lit.* to A. N., 18th July 1853). We are indebted to Professor A. Newton for a perusal of this and several other letters of the late Mr. Edward.

Family **ALCEDINIDÆ.**

Alcedo ispida, *L.* Kingfisher.

From the Brora to the Spey we have notes of the occurrence of the Kingfisher, though it is only a straggler. It has occurred several times on or about the Ness, one as lately as December 1886. The earliest of which we have any date was taken at Ness House in December 1851. Harvie-Brown saw a Kingfisher on the Fiddich in May 1884. Other localities where it has occurred are the Black Burn near Elgin, Dalvey, Cawdor, and Flemington, all in Morayshire or Nairnshire.

St. John says it is a rare visitant, but he has seen it on the Findhorn. In 1863 Captain Dunbar-Brander saw one between the mouth of the Blackburn and Pittendreich at Northfield—the only one he ever saw.

In 1866 Norman designated the Kingfisher as a rare and local species, occurring on the Findhorn, and one as obtained at Dalvey. Referring to another occurrence, Brown of Forres says:—'Of rare appearance here, one having been shot on the Moy Burn, Dalvey, near Forres, in the summer of 1884. The skin was dressed for a hat.' It is marked by Mr. Stuart as frequently seen on the Spey, but the eggs are not in his collection. It occurs on the Nairn behind the house of Newton of Budgate (*auct.* Charles Gowan and the late W. Stables). One was seen close to Moy about seven or eight years previous to the date of Mr. Chadwick's list given to us in 1885. In 1891 some had been seen lately in the grounds of Brodie House, and one was released which had been entangled in a lawn-tennis net.

It is noted as occurring near Cullen in local lists (1891). Mr. George Sim records one killed at Lower Smiddy Seat, near Turriff, in August 1878; and Dr. J. O. Wilson says:—'Rare. I have only seen it once on the Bogie, near the manse of Huntly, on September 7th, 1885.'

Mr. L. Hinxman saw a Kingfisher on the Spey at Delfour, near Boat of Bridge, on October 23rd, 1893.

Family **CORACIIDÆ.**

Coracias garrula, *L.* **Roller.**

A rare visitant, usually appearing in spring and autumn. Two are recorded from Dornoch and Morvich (*Fauna of Sutherland and Caithness*, p. 157), and another was shot at Swordale, in the east of Ross-shire, in October 1892, as recorded in *Land and Water*, 29/x/92, and also in the local papers.

Edward records 'one killed on the hills of Boyndie,' near Banff. No trace of this specimen is left, and there are none in the Museum, nor has it a place in Smith's lists. Gray mentions Edward's bird, and adds 'in September 1848'; he appears to have obtained his information direct from Edward, and in the *Zoologist* the Rev. A. Smith records the same bird (*op. cit.* 1848, p. 2302).

One was obtained near Elgin a week after the one obtained at Dornoch; the latter is still in possession of a friend of Sheriff Mackenzie of Dornoch. In 1831 one is said to have been obtained at Ballindalloch, as reported at the time in a local paper. Another was mentioned in the *Fauna of Moray* as having been seen by Mr. A. Allen at Upper Maubeen, and in reply to further inquiry, Dr. Gordon sent us a letter from that gentleman, in which it is stated:—'As nearly as I remember, it was in the summer of 1857 I saw the Roller.' Dr. Gordon thought there could be no doubt of the identification, but we know how difficult it is to identify birds from unscientific descriptions, often given after leading questions, and how valuable is the aphorism, 'What's hit's history, but what's missed's mystery.'

However, the following record can be relied upon. The Rev. Dr. Forsyth, Abernethy, possesses a specimen killed in that parish, which was shot not very far distant from the famous 'Peter Porter's Pine.' In 1892 Harvie-Brown saw the bird, visited 'Porter's Pine,' and Dr. Forsyth pointed out the place where the bird was shot. It is somewhat to be regretted that the specimen is in very poor preservation, but if it were placed in any of our museums, and properly overhauled by a capable taxidermist, it would yet be not absolutely unrecognisable.

Family **MEROPIDÆ**.

Merops apiaster, *L.* **Bee-eater.**

Hypothetical occurrences at Hills of Boyndie and between Huntly and Dufftown are given by Edward.

One killed at Lossiemouth in October 1853, as given in *Fauna of Moray*.

Family **UPUPIDÆ.**

Upupa epops, *L.* **Hoopoe.**

Several have been recorded from the north-east of our area (*Fauna of Sutherland and Caithness*, p. 157-8), and others have been obtained north of the Ness in 1857 and July 1859, but the exact locality is not given in either case (Macleay). St. John says he has never seen the bird in Morayshire, but on July 27th, 1853 (?) he had a letter from the Dunrobin keeper, saying that he had just killed one in the middle of Golspie.

One was seen about 1870 up Strath Glass (A. Craig). Another was obtained at Beauly in July 1879, and a third at Beaufort, July 6th, 1888.

Sub-order *COCCYGES ZYGODACTYLI.*

Family **CUCULIDÆ.**

Cuculus canorus, *L.* **Cuckoo.**

Local Name.—Gowk.

Strangely enough, Hepburn in his 'Notes on the Birds of the Northern Districts of Inverness-shire' (*Zoologist*, February 1848), passes over this common bird in silence. Although the Cuckoo is to be met with everywhere, it is perhaps more abundant locally, than common in every district. For instance, we have only once heard its well-known cry in the immediate vicinity of Inverness, and that was in the summer of 1892. In the northern portions of our area Cuckoos seem to be more partial to the wilder and partially wooded straths.

A common summer visitant, more abundant some seasons than others. Dates of arrival are given:—April 28th, heard at Dallas (1849); Birnie, 29th April (1886); 1880, March 14th, at Forres (Dr. Innes), 1844; 29th April 1886, near Elgin (Dr. George Gordon)—*Fauna of Moray*, q.v. Dr. Gordon supposes it to arrive some weeks before it utters its note. Brown of Forres designates it as 'common, but not very abundant.' It arrives, he says, early in May, and departs in July or August, but we think these dates are not extended enough. Mr. Brown says further it frequents parks and plantations bordered by fields and pasture-fields, woods and thickets. In 1885 the Cuckoo was first heard on the Fiddich on May 6th by our friend C. G. Danford when fishing the sheltered lower reaches of the river for trout. The weather was bitterly cold, and Ben Rinnes white under snow-fall, and snow falling in the pools which we were fishing. This Gowk Storm is said always to herald the first advent of the Cuckoo. In the same year (1885) Dr. Gordon heard it first at Birnie on the 8th May.

An increase of the species occurred at the Lower Cabrach valley in 1892, and this was still further accentuated in 1893 at the same place. Hinxman records a similar increase and abundance at Inchrory, and saw one almost on the highest part of Beinn-a-Bhuird, 3900 feet, on July 3rd.

Order **STRIGES.**

Family **STRIGIDÆ.**

Strix flammea, *L.* **Barn Owl.**

Local Names.—(For all Owls) Oolets (Gregor).

The Barn Owl does not appear to have extended its breeding range as yet to the northward, at least we have received no notes of its having done so. It has occurred in the north-east of our area on several occasions (*Fauna of Sutherland and Caithness*, p. 159). A dead one was picked up at Badenloch in April 1890, as recorded in the *Annals of Scottish Natural History*, vol. i. p. 161. In the spring of 1892 a pair was seen at Kintradwell, Brora, and one of the birds was shot by the keeper (who did not know what kind of bird it was, never having seen one before), much to the regret of the lessee, Mr. Houstoun. On October 14th, 1894, Barn Owls were heard at Golspie.

We have notes of the occurrence of this bird from such different points as Invergarry, where it is said to breed, Fort Augustus, Guisachan, Alness, and Forres; from Fort Augustus as early as 1850; from the other places mentioned, except Forres, much later; thus showing that, although the bird cannot be called common, it is widely spread.

Mr. Craig says that at Glen Urquhart the Barn Owl is much thinned out by trapping (1892); this seems to imply that it *was* common, or it may have been only a repetition of hearsay.

This is a species that has spread immensely during the last forty or fifty years. T. Macpherson Grant in a letter to Dr. Gordon, December 1844, says:—'Above twenty years ago one was found sitting in an empty room of an unfurnished house near the bridge over the Spey at Craigellachie, and was taken alive. It was given to me as an unknown bird, and was kept in confinement for several months. This is the only instance within my knowledge of the occurrence of the species anywhere in the north.'

Since then the species seems to have spread all through our area, as we have notices of its occurrence on every hand. In a footnote to St. John's *Sport and Natural History in Moray*, p. 298, the editor mentions that a schoolboy brought a pair of White Owls from England more than twenty years ago (previous to 1863) to Nairn, and that they increased, their first independent settlement being in the tower of Kilravock.

In 1836 'a live specimen was taken at Pluscarden' (Foljambe in *Fauna of Moray*). The Barn Owl, however, even at present, is not universally admitted to be a common bird. Brown of Forres very seldom receives one for preservation; the last he got was on May 2nd, 1888, and Hinxman queries its occurrence in Glenlivet, Inchrory, or Glen Avon. On the other hand, again, it is marked as common, and eggs have been procured by Mr. Stuart, Grantown.[1] On or about the 12th October a very fine one was caught at Dalvey in a pole trap, and Captain M'Leod of Dalvey had it alive in a cage in the garden (W. Brown, *in lit.* 12th November 1891).

But in recording the occurrences of this species a certain amount of care must be taken. Sim sounds a warning, and says *in lit.*:—'Care must be taken as to the reported occurrences of this species. The Tawny Owl,' he adds, 'is often brought to me and spoken of as the Barn Owl.' We have not ourselves met with this confusion of names, but since Mr. Sim's warning we have exercised every care to avoid mistakes. The Barn Owl is not spoken of by gamekeepers on Lower Deveron as very rare, but as much rarer than Tawny and Long-eared Owls. Dr. J. O. Wilson says, 'not common: saw one fly out of a joist-hole in the keep of the old castle about five years ago: one was shot at Carse of Kinnoir about the same time, and the stuffed specimen was exhibited at a meeting of our Society' (Huntly Field Naturalists' Club).

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[1] Catalogue of Birds' Eggs in collection formed around Grantown and in Strathspey—MS. in our possession.

Asio otus (*L.*). Long-eared Owl.

Generally distributed throughout the whole of our area, wherever the woods afford it sufficient shelter; commoner in the low country about Nairnshire and Morayshire. Building as it does in trees, especially firs, and utilising the nests of other birds, it must spread rapidly as the present plantations grow up, even as high up the country as Newtonmore, from which place specimens have been sent in to Inverness for preservation. It is not common in the Glengarry district.

In St. John's time the Long-eared Owl was considered the commonest of Owls by him, breeding in old crows' nests in fir-trees.

If unmolested, Owls will live very near a house. At Badenloch there was a very small plantation just round the house, perhaps an eighth of an acre in size, and a pair of these birds took up their abode, and were often seen in the evening. Of course the keepers were not allowed to interfere with them.

In his *Fauna of Moray* Dr. Gordon designates the Long-eared Owl, even at that date, as 'by far the most abundant of the owl tribe in this part of Scotland.' Brown of Forres, however, seems to place the Tawny Owl first in value as regards numbers, and describes the present species 'as common, but not abundant,' and occurring in the wooded parts of the districts around Forres. Edward says it is 'plentiful; the most common of all our owls.' Dr. J. O. Wilson considers it 'plentiful.' We have observed it around Rothiemay, and Major Playne Smith, lessee of Avochie, has had both this and the Tawny Owl in captivity. The late Mr. Templeton,[1] gamekeeper for upwards of fifty years upon the Countess of Seafield's estates, had Long-eared Owls in confinement at Castle Grant, which we saw, along with a tame eagle and a tame trout, in May 1892.

Other correspondents consider the Long-eared Owls as the commoner, and vermin lists do not assist us at arriving at definite results, as either all owls are classed as 'oolets'; or, as we are glad to find, owls are not considered always as vermin, except by prejudiced gamekeepers who have seen them at times take a young pheasant at the coops, and therefore wage war against them. Verily, there are more things patent to the eye of sense than are dreamt of in their philosophy. Merlins have been known to chase a sparrow-hawk which had a small bird in its claws, so even the *wise men* of old who first uttered the Scotch proverb—'Hawks dinna pike oot hawks' een'—were not on perfectly reliable ground.

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[1] Templeton died in June 1892 not very long after Harvie-Brown paid him a visit and saw his pets.

Asio accipitrinus (*Pall.*). Short-eared Owl.

Rare as a breeding species, if indeed it does now breed anywhere within our present area, but is commoner in the autumn on migration, throughout the low grounds of Morayshire and Nairnshire. The bird is only seen sparingly at Invergarry. Mr. Jennings remarks that it is common and resident in the neighbourhood of Tain, but on the other side of the firth we have only heard of one instance of its breeding in our area (*Fauna of Sutherland and Caithness*, p. 160).

Rare and only occasional occurrences of this bird are given amongst our earlier records. One was shot between Elgin and the Marnoch Hill as early as 1836, as recorded by Foljambe in the *Fauna of Moray.*

Brown of Forres describes it as 'common, but not abundant, arriving here in October from the north. In winter it is found in turnip fields,' and by the sides of hedges and brooks. It is absent in May.

Syrnium aluco (*L.*). Tawny Owl.

According to some of our correspondents this is quite the commonest owl in the Moray area, and we have notices of its occurrence from nearly every place within our limits, and the records go back, at least as regards the Spey district, nearly to the beginning of the century, when they bred commonly about Ballindalloch. Of the two varieties, the red and the grey, the latter seems to be the commoner in the north of Scotland.

Although this bird was unknown in the north-east of our area forty or fifty years ago (Macleay), it now breeds regularly about

Rosehall and Dunrobin and the large woods thereabouts. St. John, however, spoke of 'Owls' as being very numerous and hooting much at night around Rosehall, when he was residing there in the late forties. Many were caught in pole-traps, which instruments of torture, however, he ordered to be disused, in compassion for the poor birds: he did not state the species (*vide* St. John's *Sport in Moray*, under the chapter 'Life at Rosehall.') St. John also says that it was by no means rare in the neighbourhood of Elgin. We have notes of it from Guisachan, Invergarry, etc.

The Tawny Owl certainly appears to outnumber the Long-eared Owl, at least in some parts of Moray Basin; and these, we fancy, are where pine woods occupy large areas, and where deep cloven rocks and gullies are interspersed. So at least would the numerous lists in our possession indicate.

The Tawny Owl occurs not only in the woods and wooded glens among the foot-hills of the Carn district of Spey, but far up close under Braeriach, whence specimens have been sent to Macleay, and it is common in Upper Badenoch.

On one occasion, when Brown of Forres was preparing a specimen of the Tawny Owl, he found a whole greenfinch, almost perfect, in its stomach. He adds the remark, 'The owl must have had great difficulty in swallowing it whole'! Yes, we conclude so, and therefore that the principal food-supplies of the species do not consist of birds, but of the smaller mammalia, although during migration nights at lighthouses owls are well known to feast freely on small birds, dashing inside the glare, seizing with swift clutch, and again disappearing into the darkness.

Nyctea scandiaca (*L.*). Snowy Owl.

A very rare bird in any part of our area. In the extreme north, one was killed at Achintoul, in the parish of Kildonan, but we have no further notes of its capture than what we have given in the *Fauna of Sutherland and Caithness*, p. 162.

St. John, in his *Wild Sports and Natural History of Moray*, p. 209, says:—'The Snowy Owl (*Nyctea nivea*), a magnificent bird, is an occasional, though a rare, visitor here. I have known more than one instance of its being seen and killed on the sea-coast of this country.'[1] Gray, *Birds of the West of Scotland*, p. 62, mentions a specimen that was killed at Loch Ness on October 1868. Another specimen was sent to Macleay, Inverness, by Tomlinson, from Knockie, in November 1859.

Edward, in the Appendix to his *Banffshire Fauna*, gives an account of the finding the nest of this species in a sea-cave near Cullen on the Banffshire coast—which is beyond credit, however.

Dr. Gordon of Birnie mentions two specimens of the Snowy Owl taken in Morayshire, one on the Culbin Sands in the spring of 1833, after a severe gale from the north-east; the other was found 'about four years ago' on the shores of the Moray Firth near Innes House (vide *Zoologist*, 1847), and the *New Statistical Account* probably refers to the same specimen as obtained among the sandhills (vol. xiii. p. 220, parish of Dyke and Moray).

The last that has been obtained in our area was shot at Cawdor in December 1892, and seen by ourselves in Macleay's shop.

Scops giu (*Scop.*). Scops-eared Owl.

The only instance of the occurrence of this bird in our area that we know of is the one referred to by us in a previous volume (*Fauna of Sutherland and Caithness*, p. 163) as having been shot at Morvich in the latter end of May 1854, and mentioned in the Proceedings of the Royal Physical Society, Edinburgh, vol. i. p. 4.

But on the 24th October 1856 Mr. R. Small of Edinburgh entered the note :—'Scops-eared Owl, Morayshire (not sure)'; and we are indebted to Mr. Small for a copy of the list of varieties which have passed through his hands between the dates of April 26, 1854, and November 16, 1886, which we have often found most useful and valuable. Further inquiries in the above case, however, failed to elicit particulars as to the ownership or destination of the specimen.

Bubo ignavus, *Forst.* Eagle Owl.

In his *Natural History and Sport in Moray*, St. John says, p. 299 :—'I have only known one instance of the Eagle Owl (*Bubo maximus*) being seen in this district, and it was not then captured; but the description given to me could not have applied to any other bird.

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[1] See also *Wild Sports of the Highlands*, p. 72.

The Owl which I allude to was seen in a tree in the woods of Brodie.'

[*Obs.—Carine noctua* (Scop.). Little Owl.—'On the 5th of July 1878, at 9 P.M., I saw a small owl perch for a little on a pole in the garden, at Manse of Birnie. Perhaps the Little Owl' (Rev. G. Gordon in MS.).]

Order **ACCIPITRES.**

Family **FALCONIDÆ.**

[*Obs.—Circus æruginosus* (L.). Marsh Harrier.—'Specimens of these birds are occasionally shot in this neighbourhood' (Edward, *Fauna of Banffshire*, Appendix), and it is included as a breeding species in Banff by Mr. A. G. More, in his paper in the *Ibis* for 1865, on 'The Distribution of Birds in Great Britain during the Nesting Season,' probably on the authority of Edward.

The Marsh Harrier is a very rare bird in our district, and we have no other record of its occurrence than the above, nor have we any notice of it from Macleay, Inverness.]

Circus cyaneus (*L.*). **Hen Harrier.**

Much rarer than formerly, and we believe they are almost, if not quite, extinct in the Sutherland portion of our area. Few come in to Inverness for preservation as compared with what was the case some years ago; and this, nowadays, is a very good test as to the rarity or otherwise of any of the family of Raptores, Golden Eagles excepted. In 1844, and previously, this was one of the commonest birds of prey in the low country, where it is now only seen occasionally, and then mostly in the early autumn. St. John mentions it as common in his time on the low grounds in winter, but this we do not think is the case now.

Harriers entirely leave the high ground for the winter, and our experience is that they are not common, even if present at all, on the low ground at that season. The old males are not much seen (or noticed) at any time, unless they are looked for near the nesting-places during the breeding season.

At both Guisachan and Invergarry the Hen Harrier is a very rare bird. At the latter place Mr. Malcolm has only seen one which was shot there. Mr. A. Craig does not mention it in his *Birds of Glen Urquhart*, and Mr. Jennings marks it as 'occasional in autumn' at Tain.

Dr. Gordon in 1844 designated the Hen Harrier the most abundant and destructive of our larger hawks, and, in common with the Peregrine Falcon, Buzzard, and Kite, had the name of 'Gled' applied to it. It is the male that is the 'Grey Gled' (*Fauna of Moray*). In Dr. Gordon's later edition of the *Fauna*, however, it is spoken of thus:—'A Grey Gled seen in Mosstowie, Jan. 1856; now very rare.' In 1857 Mr. William Robertson, residing near Carr Bridge, took a nest on the moors with five young ones. He adds:—'As far as I remember, there were twenty-three young Grouse and two Ring-ouzels beside them. I killed all but two, which I took home and put in a cage with the twenty-five birds on a Saturday night, and on Monday the whole were devoured, which proved to me they were the very worst vermin we could have' (*in lit.*).

We have ourselves only rarely met with the Hen Harrier within our Moray area. We have seen it on the high moors near the sources of the Findhorn many years ago, and also close to our boundaries in the south-west around Dalwhinnie in 1884. In that year also two pairs bred near the sources of the Conglass Water, which runs into Avon near Tomintoul, as related to Harvie-Brown by the keeper on the ground, and again by another keeper at a distance; and Hinxman thinks he has seen it also in Strathavon.

Dr. J. O. Wilson has no personal acquaintance with it, but has heard of its nesting on the Clashmach. He adds, the female is called Ring-tail.

[*Obs.—Circus cineraceus* (Mont.). Montagu's Harrier.—'I have only met with one of this species here. It was a first-rate specimen, a male, and a very pretty bird,' *auct.* Edward. (See also our remarks in the *Fauna of Sutherland and Caithness.*)]

Buteo vulgaris, *Leach.* Common Buzzard.

Local Name.—Gled.

Once a common enough resident, where the trees were large enough or the country rocky enough to afford nesting sites. It has become much rarer of late years; thus at Invergarry only one appears in the 'Black List' for 1884, whereas no less than 285 were killed during the years 1837-1840 (*vide* Knox, *Autumns on the Spey*, p. 146). Still the species occurs yearly over a great part of our present area, Macleay receiving specimens for preservation from widely separated localities.

Dr. Gordon, in the *Zoologist* for 1847, remarks that although 'regarded as a common British bird, yet it is believed that its actual occurrence in this district was first ascertained by Foljambe, whose gamekeeper trapped three specimens in the hills between Rothes and Knockando.' In the Forest of Dulnan, Wolley took three eggs from a nest in a fir-tree within four or five miles of Carr Bridge on the 3rd of May 1857; the same nest having been occupied by a Salmon-tailed Gled the year before.

Writing of the Buzzard in his *Natural History and Sport in Moray*, St. John remarks that it was then much less common than formerly.

But the once common Buzzard is now one of the rarer birds of prey in the faunal area of Moray. It has been reported to us by Mr. J. Grant, gamekeeper, as extinct around Abernethy for thirty years previous to 1880 (say by 1850). Stray birds only are occasionally seen or obtained. In the extreme south-west of our district there is every reason to believe it still may be found breeding sparingly, as also near the upper waters of Spey. In 1885 Backhouse saw four birds together—probably a family party—which were flying about near the watershed, not far from Dalwhinnie. One was distinctly seen by Harvie-Brown in April 1891, hovering over the skirts of the woods between Rothiemay and Corniehaugh, at which the keeper on Rothiemay seemed surprised when Harvie-Brown told him. Buzzards are said, however, to breed at or near Troup Head by Mr. Lennon, birdstuffer in Banff, and we saw one in his shop, which he stated was shot there. Sim, however, doubts this statement, although of late years some had been sent to him for preservation from that locality during the months of September, October, and November. We are inclined to agree with Mr. Sim that these are mostly migrants from Northern and Central Europe, because Troup Head would prove to approaching migrants amongst birds of prey almost if not quite as enticing ground as Ousdale in Caithness (vide *Fauna of Sutherland and Caithness*, p. 56).

Dr. J. O. Wilson saw a Buzzard (sp. ?) flying about the Craigs of Succoth some time ago, about twelve years previous to 1888, or say about 1876. One also which was shot at Meleath has been stuffed, and is in the farm-house of Broadlands, near the Binn Hill. In 1887 one was reported to us by Mr. R. Thomson as having been caught in a trap on an island in the bed of the river Findhorn, and it is now in Glenferness House (1st March 1887).

The Common Buzzard still appears to breed in the neighbourhood of Foyers, judging from notes sent us by Mr. J. Chisholm, keeper there. It has been, however, always a more abundant species in the west than in the east of Scotland, according to our experience.

Archibuteo lagopus (*Gmel.*). Rough-legged Buzzard.

In the north of our area the Rough-legged Buzzard is *a rare visitor*, as we have recorded in the *Fauna of Sutherland and Caithness*, p. 166, and since that volume was published we have only heard of one other occurrence in the Sutherland district, which was recorded in the *Inverness Courier* of February 8th, 1889.

They would appear to be very rare anywhere north of Inverness, as we do not remember having seen any in Macleay's shop which had been sent in for preservation ; but, as stated in a previous volume, the Rough-legged Buzzard is found to occur not infrequently at Ousdale and other localities in Caithness.

Mr. Chisholm, Foyers, tells us that the Rough-legged Buzzard arrives there about September (?), and that they disappear in the spring.

St. John, in his *Natural History of Moray*, says he never saw but one, which, he thinks, was killed in Inverness-shire. Edward received one or two specimens from the neighbourhood of Banff, and says its nest has been found in the neighbourhood, though rarely (!). None have been sent in from our district to Macleay of Inverness for preservation for the last ten years.

Dr. Gordon mentioned a specimen of this species in a collection at Nethy Bridge, Speyside, but gives no particulars.

Edward, however, whilst almost undoubtedly wrong about its nesting in the neighbourhood of Banff, is correct in estimating the Rough-legged Buzzard as a more abundant species than the Common Buzzard, and in this opinion he is fully borne out by Sim's experience, to whom many have been sent from localities close to the borders of Deveron in the east. Troup Head affords a landmark for raptorial migrants from the north-east, and the wave of dispersal, with little doubt, splits upon that rock ; and while a portion of the birds passes down along the high lands which superintend the Deveron valley, others pass right and left of the dividing range or watershed between Deveron and Ythan. Edward had a Rough-legged Buzzard in his collection, shot at the Mill of Dunn, and another was shot at Forglen, and presented by Sir Robert Abercromby, Bart., to the Banff Museum. Another of which we have record was shot at Mayen, on the Lower Deveron, in December 1888, and was stuffed for Mr. Yule by Mr. Gardner of Oxford Street, London (Mr. Yule, *in lit.* to Mr. Beattie, lessee of Rothiemay).

Besides the above occurrences along the main line of flight, as it were, many other records occur over our area, showing that the great *cup* formed by the Ord of Caithness and the north-east corner of Aberdeenshire affords a well-worn highway of some species of raptorial birds. Thus examples of this species from Cawdor, about 1832 and 1840, were examined by Dr. Gordon, and MacGillivray refers to the unusually large flights which reached this country in the winter of 1839, when another was obtained at Cawdor (*British Birds*, vol. iii. p. 736). Macleay, in his list, however, speaks of the Rough-legged Buzzard as rare about Altyre. It seems to us that the main flight of these raptors passes down the east side of our dividing range, and are more frequently observed farther south, as is the case with some other winter migrants. On once reaching the most prominent land they appear to trend southward, just as we have seen in the case of large flights of Norwegian Ring-doves. No doubt a comparison of all available records of Rough-legged Buzzards in Scotland would very plainly map out their lines of flight. We look forward with expectancy to having these lines laid down with precision, when Mr. William Evans issues his long-looked-for publication on the birds of the east of Scotland. Meanwhile Mr. James Lumsden of Arden has done good service in recording the occurrences of this species over

Scotland up to the date of our last rush in 1875[1] (*Proc. Glasgow Nat. Hist. Soc.*, vol. iii.).

Buteo lineatus, *Gmel.* Red-shouldered Hawk.

Although not, strictly speaking, a British bird, yet the only occurrence of this American species in the British Isles comes within our area, and so we give it a place in our list. It appears, however, to have been a skin, and to have passed through two dealers' hands before coming into the possession of Mr. E. C. Newcome of Feltwell Hall, Brandon, Norfolk. It is stated to have been killed by J. Macdonald on February 26th, 1863, at Kingussie, Inverness-shire (vide *Ibis*, 1865, p. 549).

Aquila chrysaëtus (*L.*). Golden Eagle.

Resident, and not uncommon in all mountainous districts, especially in the deer-forests, where it is generally preserved. For obvious reasons we do not give precise localities—indeed, in many cases we are pledged to the proprietors not to do so,—but we have abundant evidence of many breeding sites, and the bird, if not increasing, is by no means decreasing.

In our area north of the Dornoch Firth the Golden Eagle was a common bird until sheep-farming became common. Early in the present century the Sutherland Association was formed 'for the protection of property, etc.,' and, rewards being given for the destruction of eagles, amongst other creatures, these birds soon became scarce, as evidenced by Wolley in 1848. Later, however, the proprietor has done his best to preserve these birds, and one if not two eyries are regularly used. In two other places they breed, or rather attempt to do so, but are generally either trapped or robbed of their eggs in the interests of the game-preserver and egg-collector. There are few suitable localities for them to breed in in this district, though the birds are often seen in the autumn.

South of the Dornoch Firth, eagles breed in many places, where the country becomes more mountainous. At Balnagown some of these birds are kept in a cage; a single young one was brought from a nest in the Alladale Forest, by Lady Ross's orders, in 1888, and deposited there.

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[1] Such monographic papers as this are most valuable contributions to our fauna, and, if applied to other conspicuous migrants, would vastly assist in arriving at permanent conclusions about the fly-lines of migrants. Therein lies plenty of work for Scottish naturalists still, and let no one say the subject is yet exhausted.

In 1851 Eagles were shot, doubtless in the breeding season, on Ben Wyvis, as appears from the extracts of a letter from Mr. J. M'Gregor, dated March 24th, 1852, and recorded in the note-books of the late John Wolley. A later communication from the head keeper there states that Eagles only breed on Ben Wyvis during a mild season; if very severe they leave for lower and warmer quarters (?).

We have notes of eagles from all parts of our district. Captain Stirling informs us they have been seen at Fairburn, probably as migrants. In 1847 Hepburn mentions with great regret that during his visit to Inverness-shire he never saw a Golden Eagle, so that a great increase has occurred in their numbers since then.

On the Invergarry estate Golden Eagles are rapidly increasing. They breed there as well as up Glen Quoich. Five have been seen in one party, though they generally go about in threes; four or five years ago they used only to be in pairs (Captain Ellice, *in lit.* 19th Oct. 1888).

On the Balmacaan estate a pair bred on Meallfuarvounie for many years (previous to 1882); one of the birds, however, was killed, and the other disappeared from the locality (A. Craig).

Eagles at times visit the low grounds, generally in autumn, more rarely in spring. Harvie-Brown saw a pair over the woods of Wester Elchies in the spring of 1885, about the same time of year at which he saw two Kites in the same locality.

Formerly the Golden Eagle bred on Ben Rinnes, on the borders of Banff- and Elgin-shires. In a letter from T. Macpherson Grant, Esq., to Dr. Gordon, written in 1844, he says:—'The remains of a nest are, however, still to be seen near the summit of Ben Rinnes, though I have been unable to learn how many years have elapsed since it was finally abandoned. The cleft of the granite rock which contains the eyrie is reputed inaccessible, but within my recollection there has been no inducement to hazard the attempt—a few decayed sticks and a green patch beneath them being all that has served to mark the spot.' In the same letter the writer remarks how rarely they are seen at his residence, Ballindalloch, though breeding within fifteen miles of it, and remarks that they are far from rare in the Badenoch district.

The *O.S.A.* speaks frequently of this prominent species throughout Moray. The author there gives as old localities a rock on the Upper Findhorn in the parishes of Moy and Dalarossie, which has since been pointed out to Harvie-Brown; in Glenavon, where from recent accounts they still hold their eyrie, and in Abernethy and Kincardine. But the *O.S.A.* is silent as to any occurrences of eyries on the Deveron watershed. Edward repeats the oft-quoted rocky heights near Ben Avon (vide *Life*, p. 121), and speaks of the bird as seen hovering about the sea-braes between Banff and Portsoy. If the latter record is correct, which we are much inclined to doubt, such must be considered as migrants from abroad, and not home-bred birds, or possibly as White-tailed Eagles, migrants also from over the sea. We cannot attach much importance to the statement.

The *New Statistical Account* gives the west side of Ben Wyvis on the Bealach Mor as a locality in 1845.

In 1891 we heard of a pair of Golden Eagles having been seen on the braes of Glenlivet and Glen Fiddich, and we have good proof that the birds nested in the Carn district of Spey, having seen wing-feathers and remains of an egg obtained at the place where they attempted to breed. The nearest regularly frequented eyrie, however, is far up among the mountains, and the nearest named was Loch Avon. When Mr. T. Macpherson Grant wrote about the remains of the Ben Rinnes eyrie, he also undoubtedly referred to that far-off eyrie as the nearest known to him at that time. Hinxman says that at least two eyries are occupied among the hills around Loch Avon, and we have abundant evidence of the nesting at the present day of several pairs along the range of the Cairngorms, the birds of which are fond of hunting rabbits along the slopes of the Foal's Crag below Inchrory. It will not therefore be surprising if these birds increase, and if they begin to occupy new lands, even at lower elevations, of the Carn district. This district, however, does not possess unlimited sites of sufficient security, such—as we have indicated in our topographical chapters—indeed, being extremely rare.

When Dr. Gordon wrote his *Fauna of Moray* he considered the Golden Eagle as resident only in the alpine districts, and mentions as comparative rarities specimens which were trapped on Cawdor moors and in the Streens of Findhorn; and indeed there is every reason to believe they were rarer then than they are now, as the increase of afforested lands throughout North Britain has undoubtedly increased their chances of survival and increase.

Of their distribution in the western parts of the area there is still abundance of evidence in Badenoch and to the westward. In 1881 eagles bred close to the river Spey in Badenoch, and Harvie-Brown saw one young bird alive at Strathmashie shooting-lodge which was taken from the eyrie. At Lynwilg Hotel there is a fine young bird, stuffed, which was shot in Glen Feshie, where they still breed, as also in Gaick. An old eyrie, not now occupied, although the birds are often observed, was the scene of one of Roualeyn Gordon-Cumming's exploits, and is known as the Black Rock of Loch Errochd, and eagles are still natives of Ben Alder deer-forest. Harvie-Brown has repeatedly seen eagles at several localities in Badenoch and Lochaber; he saw in one instance a single bird chased for a long time by two Ravens near the end of Loch Laggan in May 1881, and others were seen, the same year and month, at a retired loch near to which The Cluny is said to have hidden after the battle of Culloden.

In 1892 Hinxman wrote us:—'One of the Glen Avon birds has been hunting the hills of the Braes of Livet and carrying off some lambs'; and whilst residing in Glen Livet in the summer of the same year Harvie-Brown was informed that a pair had a resting-rock in the vicinity. The gamekeeper, whom we also interviewed, once trapped a Golden Eagle by one claw and took it alive to Mr. Skinner, the Duke of Richmond's factor at Drumin. Owing to strict orders given by His Grace to all whom it concerned, and in accordance with these orders, the bird was released, and flew away, rejoicing again in freedom (see under 1893, *infra*).

Although eagles have made attempts to nestle within the precincts of His Grace the Duke of Richmond's deer-forest as yet unsuccessfully, we are earnestly in the hope that they may yet succeed in rearing their young, and that an interesting addition will be made to the list of inhabited eyries of Scotland. This desirable consummation must in great measure depend upon the integrity of those servants of His Grace who have charge and ward, and their honesty in refusing bribes by 'unconscionable raiders' and so-called ornithologists or collectors.

Other eyries we might indicate, but we refrain, as already circumstances have laid some of these open to the 'indiscriminate grabber,' and it is not desirable to induce further rivalry in such a 'tug of purses' as would probably be occasioned over every unfortunate eyrie which has the bad luck to be '*labelled common property.*'

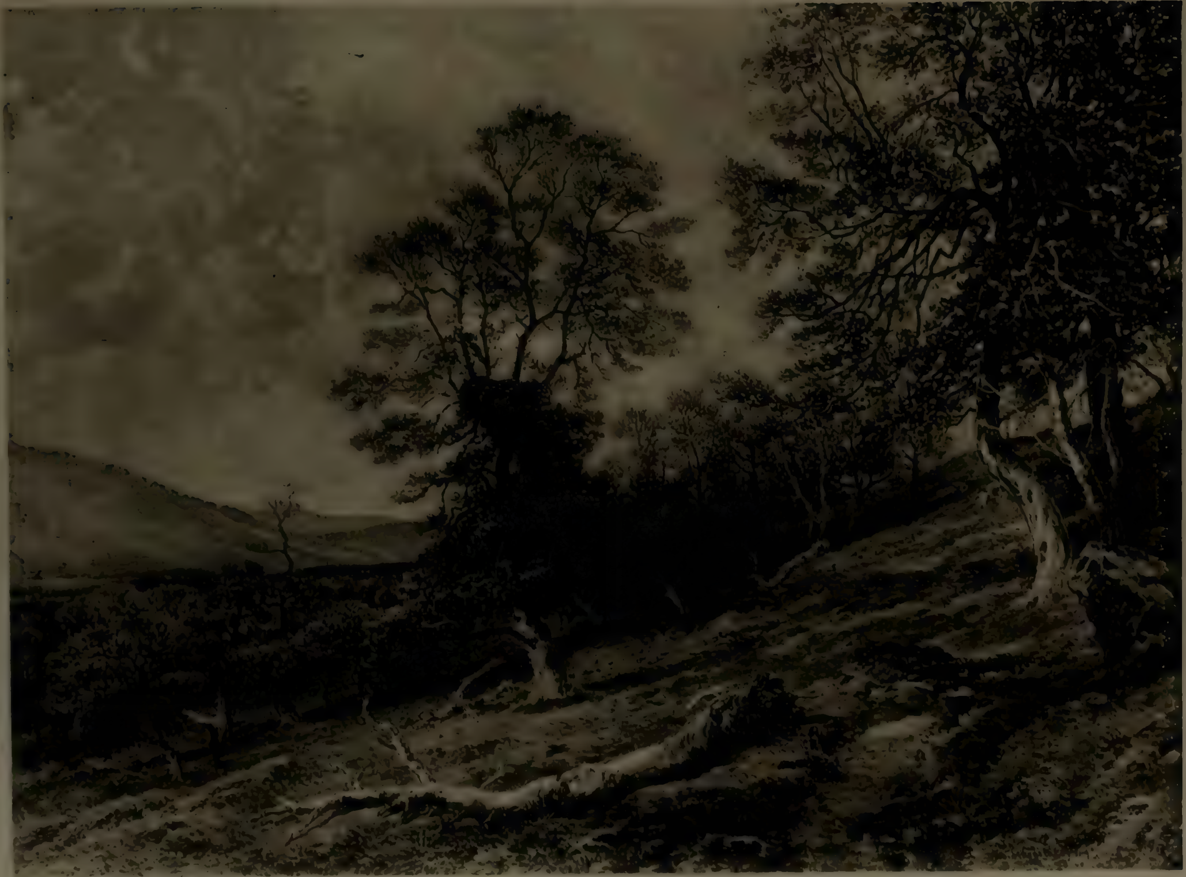
We may mention, however, that there are still at least two tree-eyries occupied in our area, one of which may not be occupied every year, but from which young are certainly occasionally hatched off, as was the case in 1883.

In 1893 Mr. Norrie and Harvie-Brown visited the Glenfiddich nest, and the accompanying portrait of it is taken from a photograph. We think it of sufficient interest—from the peculiarity of its situation and close proximity to occupied houses, though these latter are not within the scope of a camera—to extract a few notes, taken upon the spot, from our Journals. The nest is a considerable structure, not more than 18 or 20 feet from the ground, in a birch-tree, which is itself not more than 35 to 38 feet high. The tree grows amongst other scattered birches—which could easily be counted in a few minutes—and stands upon the gently sloping rise of a narrow glen which faces north, upon a small tributary stream. Any 'halflin' loon' could climb it, as the lower branches are only about four feet from the ground. The edge of the slope of the bank above the nest may be 50 feet, and by climbing another birch close at hand, it was easy to see right into the nest.

We were told that the birds reappeared this year, but soon left, and that they repaired the nest. But we saw little appearance of that, the nest looking rather *décolletté.* The slope is a grassy one, on which grow white bleached grasses, mingled with close-cropped blaeberry tumps and heather patches. The glen is lonely enough in appearance, but there is a path within fifty yards of the nest, on the opposite side of the glen, and a second path turns back at an acute angle up the other side, passing within twenty yards of the nest, which is thus situated in the angle so formed. The paths were made, however, fully sixteen years ago, and long before the eagles came there. Mr. Norrie took five photos of the nest and situation. Later in the season the head forester related to us the history of these birds, which was noted down by us as soon after as possible. 'When the eagles came first in 1891 they selected another site not far off' (we have already spoken of them in that year.—EDS.). In 1892 they shifted ground, but were unsuccessful in rearing young, though an egg or eggs were laid. In 1893 the Glen —— eagles returned and laid eggs, and the hen was seen sitting on the nest, but some person unknown to the head keeper took the eggs. The birds naturally left, and one of the keepers accidentally caught one of them (the cock?—see further on) by two of the claws or toes. The head keeper cut these off and gave the bird its freedom, and the two birds were seen together afterwards. Our informant added, 'The curious thing was that the other foot had lost two claws or toes' (compare the statement of the keeper in Glenlivet of how he trapped one last year or the year before, and took it down to the factor's house at Drumin; and which, when released, flew away up Glen Avon). Our informant then added the information that this bird—trapped in 1893—measured 6 feet 6 inches across the wings, had a *white spot on each shoulder*, and white across the root of the tail, but that the other bird was much blacker, and had no white on the tail. This indicates immaturity in the one—probably the male—and greater age of the female. All the above happened before Mr. Norrie and Harvie-Brown were there on April 20th and took the photos.

The sequel to the above relation is as follows. Mr. Hinxman, in his report to us of the birds of Glen Avon, when speaking of Eagles' eyries, mentioned 'a huge mass of sticks in a very accessible situation in Glen ——, but it has not been occupied for many years'; and in a later communication he informs us that the eagle had returned to this site late in the season, had laid and sat upon two eggs, but after some weeks he took them, and they proved to be both addled.

The nest of 1891 was destroyed by a heavy fall of snow, and fragments of eggs were procured by the keeper. The birds shifted to the present site in 1892, and had only one egg, and they sat on this till the 1st of June. This egg was destroyed by frost, so



EAGLE'S NEST IN TREE IN THE CARN DISTRICT OF SPEY

far as is known. The same place was occupied in 1893, but the egg or eggs were destroyed by some person or persons unknown. On May 7th one of the birds was trapped by a keeper, and two toes had to be cut off: this was supposed to be the male. The above is an abstract of information supplied at a late date by the head gamekeeper, who adds :—‘ The bird is none the worse, as I see *them* often flying together. Both birds sit time about on the nest, as far as can be made out. In the month of March 1893 I saw three Eagles together.’

Of another alternative eyrie, also within the limits of the same deer-forest, we are credibly informed, by one who traverses these mountaineering-club paradises, that the eyrie was *not* used this year. All the eyries except one partake of very similar characteristics—simplicity and accessibility, and are abnormal in the selection of the sites. The eggs have either been stolen or broken by Hooded Crows, or taken bodily away; and the Glenfiddich birds’ eggs have always been addled, and so with those taken by Hinxman. These latter also were almost colourless. Further, on Hinxman’s nest only *one bird*—the female—was seen, and she sat steadily for weeks. Either the eggs were addled or infertile, or became addled if she had to leave her nest for food and was unassisted by her mate, which, with two feet maimed, and possibly two claws or toes cut off each foot, may have perished, or been unable to supply food enough for both himself and her.

Eagles are seen at times flying high over the plains or Laigh of Moray. Captain Dunbar-Brander relates how he once observed one, ‘ seemingly crossing from Ross-shire to the Cairngorms; it was travelling and circling, “ waltzing,” like a Vulture, and there were half a dozen Rooks mobbing him. He was crossing over Spynie high up, about twice the height of “ the Muckle Kirk ” of Spynie.’

Haliaëtus albicilla (*L.*). White-tailed Eagle.

Of the former breeding of this bird in the Sutherland portion of our area we have little information. They were at one time more abundant than the Golden Eagle, and about the year 1850 bred in various inland localities, such as Ben Hee, and on an island in Loch Fiack. They also bred in a rock on the Ord, and Sandy

Armstrong, an old ghillie, lately residing at Helmsdale,[1] when a young lad, was in the nest for the young or eggs; this must be sixty years ago, or even more. We have no record of when the old birds deserted the locality.

Another inland locality for this species was at Loch Loyne, near Invergarry. Donald Gillies, an old and most intelligent man, told us that the White-tailed Eagle bred on an island in that loch. The nest was first placed on a fir-tree, which was cut down in 1835; after that it was built in a birch-tree.

Although no longer breeding in our district, yet the Erne is an occasional visitant to the shores of the Moray Firth. A pair of eagles, most probably of this species, used to breed on the sea-rocks near Cromarty on the Black Isle, as mentioned by St. John in his *Wild Sports of the Highlands*, but even then (1845) the eyrie was deserted. The entries in Macleay's ledger of the White-tailed Eagles sent in to him from our present area for preservation since 1850 are only two in number, viz., one from Carr Bridge in June 1854, the other from Cantray in October 1864. Duncan M'Lennan, stalker at Guisachan, told us he got a Sea Eagle about 1883.

Ancient record tells the tale of the White-tailed Eagles nesting on the Pennan rocks and cliffs near Troup Head. The curious coincidence is related of the disappearance and reappearance of eagles at Pennan Rocks on the north coast of Aberdeenshire, in fulfilment of Thomas the Rhymer's prophecy in connection with the survival of the family of Baird. From this account it seems that the Eagles disappeared when the property was sold by the Bairds, and reappeared when Lord Haddo married Miss Christina Baird of New Byth, and again disappeared when the estate passed into the hands of the Honourable William Gordon (*N.S.A.*, Aberdeenshire).

Mr. John Martin, some time Curator of the Elgin Museum, a few years previous to the issue of the *Fauna of Moray*, observed a Sea Eagle in a disabled state on the sandy beach at or near Innes House; and another was taken at the same place in 1878 (*Fauna of Moray*, edition 1889). One was obtained at Pitgaveny, which it was supposed was the same bird which was seen by Mr. Martin (*ut sup.*).

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[1] Since deceased.

Astur palumbarius (*L.*). Goshawk.

It is not necessary, nor is it perhaps desirable, to go any further back for positive records, except incidentally to mention Hector Boece, who several times speaks of 'Goishalkis, Sparhalkis, Marlyonis, and sik lik foulis' (vide *Scotland before* 1700, *from Contemporary Documents*, edited by P. Hume Brown, p. 84; Edinburgh, David Douglas, 1893).

We have no better authority for the existence of the true Goshawk in Scotland in the beginning of this century than Colonel Thornton, whose *Sporting Tour* dates 1805. His description at p. 107 in itself seems ample to satisfy the keenest scrutiny. He says:—'This Hawk is very rare; I never met with it in England that were wild. They are a short-winged Hawk, being in the same proportion to a Sparrow-Hawk (of which kind they are) as a Falcon to a Merlin. They fly at the *bolt*, and the Falcon is excellent for hares, rabbits, herns, and wild ducks; the Tercel for game.' In a foot-note he adds that 'when he managed the confederate Hawks' he always procured his Goshawks from Germany.

At the same page (107) Colonel Thornton further remarks:— 'The forest formed by Glenmore and Rothiemurcos, I have before observed, produces some noble fir-trees, and is an asylum for stags and roebucks; in it are also some eyries of *Goss-hawks*, some of which we saw.'

Later on (p. 137) Colonel Thornton regrets the loss of a falcon of the Goshawk, which was taken in the forest of Rothiemurchus, and speaks of it thus:—'Our distress was mutual, as we were both desirous of trying this Falcon—the very first specimen bred and tried in Britain, there being no account of either taken notice of in the history of falconry' (*op. cit.* p. 137).[1]

Since Colonel Thornton's day much confusion has arisen about this bird on account of the Peregrine so often being misnamed Goshawk, and this, too, even by experienced and otherwise accurate ornithologists, such as Pennant. This confusion exists even down to the present day, having been perpetuated by such paragraphs as the following:—'It is not uncommon in the mountainous parts of Scotland; particularly it is known to breed in the Forest of Rothiemurchus and on the woody banks of the Dee. Goshawks are said to be numerous in the Orkney Islands' (Montagu, quoted by Bellamy).[1] But of other independent accounts, we can assuredly trust that of St. John. In 1849 he wrote:—'The only place where I know of its breeding regularly is the Forest of Darnaway; but I am told that they also breed in the large fir-woods near the Spey.'[2]

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[1] See also Harting's *Bibliotheca Accipitraria*, p. 253.

Later—viz., in the first edition of St. John's *Natural History and Sport in Moray*, edited by Innes, and in subsequent editions—the above reading is changed somewhat (the latest edition, as we are informed in the Preface, 'having been made up of entries in his journals and note-books, incidents related in letters to his friends, and a careful description of the birds of Moray which he left in MS. with these materials, hitherto unpublished,' etc. etc. (*op. cit.* Preface, p. vii). The record then stood thus:—'The Goshawk is now nearly extinct in this country. A few years ago it bred regularly in the Forest of Darnaway, and it may still do so. It also breeds in the Forest of Glenmore, near Grantown on the Spey.'

The carefulness of the wording at the different dates is itself a testimony to the accuracy of St. John, and we are informed that the above-mentioned MS. on folio sheets, though undated, was of course written before 1856, when St. John died, and probably after 1844.

St. John, however, does not seem actually to have found a nest, as in a letter—at present in our possession—from him to Dr. Gordon, dated Invererne,[3] 20/ix/44, he says:—'A nest has been described to me as found in Darnaway, *which I have no doubt* is that of the Goshawk' (the italics are ours).

Later statements concerning the breeding of the Goshawk can only be viewed with great suspicion, on account of the confusion caused by calling Peregrine Falcons 'Goshawks,' as already mentioned. Mr. Edward mentions three Goshawks (?) in his appendix to the *Fauna of Banffshire*, thus:—'One was shot at Tomintoul a short time ago and two others, one at Hilton, the other at Macduff.'

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[1] *A Treatise upon Falconry*; Berwick-on-Tweed, 1841.

[2] *A Tour in Sutherlandshire*, vol. ii. p. 15; first edition, 1849.

[3] Invererne is near Forres, where St. John resided when he first took up his quarters in Moray.

Macleay,[1] the well-known birdstuffer of Inverness, told us that he never had but one specimen of a Goshawk through his hands. In the autumn of 1859 an adult female was caught by an old woman who was gathering sticks in Tor Vean, close to Inverness; it came into Macleay's hands, who stuffed it, and who placed it in a case with a number of other species of hawks, amongst which was a Kite. The case was afterwards sold to Sir Arthur Chichester, Bart.

In 1892 Harvie-Brown visited the ancient site of a veritable Goshawk's nest in Rothiemurchus and Glenmore, or, at least, what was very decidedly stated to be such, and of which it may be worth while to give a short account:—Within about forty yards from an old pine, which contained many borings of Woodpeckers—and from which we had obtained a limb,—close to the 'Riever's Road,' near the Rothiemurchus and Glenmore march, the old stock of a pine was pointed out to us by G. G. as being one of considerable interest. The tree, before it was cut down, was one which, according to a tradition handed down to our informant by his father—still alive, 1892,—contained a nest of the true Goshawk. What now remains is a mere stump, three or four feet high, similar to that in which on the same day we took a Crested Tit's egg. Since its early occupation by the Goshawks it was tenanted by Kites. The then keeper (thirty years ago) having set a trap and caught the Kite, forgot to look at his trap, and an old Spey fisherman found it hanging there, and, as he could not climb, he got an axe and cut it down, in order to secure the Kite's feathers for salmon flies—so runs the story. If true, thus disappeared the probable last nesting site of the true Goshawk in Scotland, and amongst the last of those of the Kite. All such tales, however, as all scientific naturalists know, must be taken for what they are worth.

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[1] Died in 1892.

Accipiter nisus (*L.*). **Sparrow Hawk.**

Abundant and resident, probably even increasing with the great amount of lately planted area. In 1884, sixty-one hawks were killed on the Invergarry estate, and these were principally Sparrow Hawks. We have notes of this species from many parts of our present area, even from Dalwhinnie, where it was noticed several times by Mr. Backhouse in the summer of 1885. The Sparrow Hawk generally leaves the higher straths in the winter for the more cultivated districts, but it sometimes remains in the upper and barer valleys, as we have a note of one killed in Strathconon in January 1865.

At times a Sparrow Hawk becomes very destructive to poultry-yards. At Abernethy Manse, as we are assured by Rev. Wm. Forsyth, one of these birds killed two dozen chickens. It is common about the mixed hardwoods of the Findhorn, and around Forres; but is not reckoned so common as the Kestrel along Speyside generally. We have obtained the eggs at Corniehaugh and Netherdale, on the Lower Deveron (1891).

Milvus ictinus, *Savigny.* **Kite.**

At one time Kites were very common throughout our area, though this is learned more from tradition than by actual records that have been kept. The one record, however, quoted by Knox in his *Game Birds and Wild Fowl*, is sufficient to show that in this case tradition was trustworthy. The statement is that between the years 1837 and 1840, 275 Kites were killed on the Glengarry property. Probably their last breeding-place there was on a rock close to where the Garry river flows out of Loch Garry. An old keeper, Donald Gillies, who was born in that district, informed us that he had taken the nest there, though he could not remember the date.

In the neighbourhood of Glen Urquhart, a pair, the last known to have occurred in that district, were killed while nesting in the Balmacaan woods, 1865, and are now preserved in Balmacaan House (A. Craig).

Thirty years ago, or thereabouts, the Kite was very abundant in the neighbourhood of Guisachan, and used to carry off the fowls from the small farmers: they all left during the winter Now the birds are extinct there.

Mr. Chisholm, head keeper at Foyers, writes us that about forty years ago the Kite bred in that neighbourhood, but none have been seen since those mentioned as killed at Glen Urquhart in 1865. He called them in Gaelic 'Clamhan Goulach' (*in lit.* 1894).

Mr. G. Malcolm writes us that he knows a man who remembers when the Salmon-tailed Gled was quite a common sight in Glengarry. Mr. Malcolm also adds:—'I have myself been fortunate enough to see a solitary specimen at Tomacarry, at the head of Loch Garry. I happened to get quite close to it (about fifteen yards), so there was no doubt about it. This was in August last year' (1891).

In some notes kindly lent us by Mr. Muirhead, he writes that in July 1866 Arthur Laller brought him one egg that he said was that of a Kite, which he had got at Guisachan.

Mr. T. Macpherson-Grant, in a letter to Dr. Gordon, remarks that the Kite 'might almost be called common at Ballindalloch about the year 1844, inasmuch as some are killed and many more seen every year. They are most frequent in autumn and the winter months, probably at these seasons coming down from the upper districts in quest of food. I have often seen four, or even five, together, circling round in the very graceful curves so characteristic of the flight of the species. They breed occasionally with us.'

Dr. Gordon (vide *Zoologist*, 1847) says that—'The Kite was sparingly distributed over the more wooded parts of the country. A beautiful specimen, noticed by Professor M'Gillivray in his work on the *Rapacious Birds of Great Britain*, was killed in the wood near Cawdor Castle, where it had its nest in 1832. Another was killed by Mr. Foljambe's gamekeeper, on the hill near Rothes, in 1838.'

Writing about 1850, St. John remarks that, not many years since, the Kite was so common (in Morayshire) as to be quite a scourge to the henwife, on account of its depredations among the chickens, but that now it is very rare, from being so easily trapped. One he had tamed lived amicably with the poultry, which latter took little notice of it. St. John remarks that his tame Kite was very fond of being taken notice of, and had the peculiarity of uttering its loud and not inharmonious whistle at all hours, even in the night, when it saw a light or heard a person passing by. Edward speaks of it as once common around Banff, but rarely seen at the time he wrote. 'A splendid specimen was lately shot at Eden, about four miles from Banff,' and the one now in the Museum (1892) is presumed to be this bird.

Every item connected with the former occurrence of the Kite in our area, which can be collected and recorded, we consider is worthy of a place in a book professing to treat of the past and present fauna of Moray. The following narrative we believe may prove interesting to naturalists of the present, and may become of greater interest to naturalists of the future. We quote almost verbatim from a letter before us from Lewis Dunbar, who says:—

'In 1845, my brother, who was on the excise service, and lived at Bonar Bridge, was anxious to have the fork-tailed Kites and their eggs, if possible.' Lewis Dunbar was at that time a lad of sixteen years of age. He continues:—'I managed to find a nest within a mile of Grantown, Strathspey. I shot the hen as she was leaving the nest. The nest was placed on the lower, or first, branch of a bare-stemmed pine—a long bare stem with a clump of foliage on the top. Next day I furnished myself with the stable ladder, a few large spikes, and a hammer, and repaired to the tree. I mounted the ladder, stuck a spike in the tree, nearly as far up as I could reach, drove it well in, got upon the spike; and did the same again until I had five in, which took me to the branch where the nest was placed. Whether I was too overjoyed, in succeeding so far or not, I cannot say, but having lost presence of mind, the first thing I remember was my rebounding off the ground. When I tried to get up I thought there was a hole in the ground, so I looked towards my left arm, and found the elbow-joint up near the shoulder. I placed my thumb inside my arm and pulled the elbow back to the socket. The result of this was a month of pain, and partial anchylosis, and then a visit to a celebrated bone-setter of the district; and no eggs of the Kite!'

Since then Lewis Dunbar has only seen two other specimens of the Kite in the flesh, and they were sent to him at Inverness, from Balmacaan, Glen Urquhart. Mr. Dunbar thinks it is about extinct in Scotland at the present time (1892). A case containing the bird shot by Dunbar, along with two Rough-legged Buzzards, was shown in the Exhibition at Edinburgh in 1886, and sold by Messrs. Lyon and Turnbull to Mr. Robert Small of Edinburgh, at a nominal price.[1]

As late as 1878, Booth found Kites breeding in the Rothiemurchus district, and seems to have destroyed one or two of the birds—either old or young—at every nest he visited. He also adds that he knew of their nesting in the same locality, at least a year or two after, but did not further disturb them. All the nests he saw were in fir-trees, though he was told of one that was in some rocks, trees large enough not being available. Kites, however, as is well known, do not necessarily require very large or high trees to nestle in—forty to fifty year old pines in dense woods being at times preferred to those of larger and older growth.

In 1880, Mr. James Grant, gamekeeper, assured us that the Kite had been twenty-five years absent from Glenmore and Abernethy, but that they came back five years ago (say 1875). *Mr. Booth no doubt settled their term of residency.*

Others testify to its former abundance, and present rarity. The statements of the *New Statistical Account* of the parish of Ruthven, viz., that the Kite 'is known to breed in the lofty trees at Rannes and Cullen House,' is only quoted for what it is worth, in conjunction with other statements, such as 'The Goshawk, Kestrel, etc., are not common'!

The Kite, however, was familiarly known to many people still alive. Rev. J. Forsyth, D.D., of Abernethy wrote to us in 1885:—'I have not seen one for many years. I remember when they were very numerous; and a pretty sight it was to see them hunting for mice in the stubbles on a fine autumn day. Their mode of flight and of striking prey was very beautiful.' But Dr. Forsyth adds:—'Kites are still seen and sometimes killed by keepers.' Can't something be done to prevent this senseless work? *May the vole-plague ravage the lands of those who neglect this plain-featured fact!*'

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[1] Mr. George A. Panton purchased the case containing the Kite shot by Lewis Dunbar in 1848 (not 1847). The case contained the Kite, ♀; two Rough-legged Buzzards, ♂ and ♀; one Goshawk, ♀; one Common Buzzard, ♂: all except the Kite killed at Berriedale, on the Duke of Portland's estates, Caithness (G. D. Panton, *in lit.* 16/iii/92, 73 Westfield Road, Edgbaston, Birmingham).

That it formerly bred in the woods of Cawdor Castle we have the word of Professor MacGillivray (*Rapacious Birds of Great Britain*, 1832). Foljambe's gamekeeper shot one on the hill near Rothes in 1838 (*Fauna of Moray*). This is not far from Elchies, where, as will presently be seen, a pair was observed in the spring of 1885. Captain Dunbar-Brander certifies to its numbers 'when he was a youngster.' 'The Gled,' he says, 'was our commonest hawk, but I have not seen one for forty years' (*i.e.* about 1848).

By 1845—the date of the *New Statistical Account*—the Kite is stated in that work to have entirely disappeared from the parish of Forres.

The Kite is an extremely rare bird now, even as a straggler, in our present district, none having been sent in to Mr. Macleay, Inverness, for many years; in fact, only two are entered in his ledger since 1850, one from Carr Bridge in April 1851, the other from Balmacaan in 1856. However, two Kites were seen and identified by Harvie-Brown, soaring over the woods at Wester Elchies in the spring of 1885, for several days in succession, and orders were given not to disturb them. They were recognised as having been 'very plenty' many years ago, by the old salmon-fisher, Cruickshank,[1] whom we met almost daily, when he was fishing the Elchies water of Spey, near Aberlour.

Now, in 1892, Harvie-Brown being anxious to visit the old site of the Kite's nest near Grantown, and Lewis Dunbar being equally anxious to revisit the scenes of his adventures when he was a lad of about sixteen years of age, they together made a special journey to the locality, and the details of it may prove of some interest. Quoting from the latter's Journals, partly written on the spot:—'Our principal object in this visit to Grantown was to find, if possible, the old Kite's tree. But the search was vain. In the hollow below the Ladies' Bridge, *wind*—another factor of destruction—had during the past forty-six years levelled many of the grand two-hundred-year-old pines, and little doubt L. D.'s Kite's tree amongst them, and the old blaeberry-covered stoles and stumps also indicated where many had been cut. The remains of a chop-stick house, which was not there in 1846, showed how much of the timber had been disposed of, and heaps of old roots showed also where the blown timber had been drawn together.' Later, on another day, during a visit to Templeton—thirty-five years gamekeeper in the Seafield family at Cullen and Grantown, and since deceased—he verified Dunbar's location of the Kite's tree below the Ladies' Bridge. He —Templeton—shot both birds, the male as it came to the nest, and the female as it flew off the nest. The tree, he said, 'had been cut down.'

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[1] Brother of the Cruickshank who met with the miserable death in the floods of 1827, as related by Sir Thomas Dick Lauder, Bart.

No doubt this was the last nest found on Castle Grant grounds. These records have rather a melancholy, if interesting, significance. In 1892 Harvie-Brown visited several other localities formerly frequented by Kites, not earnestly searching for new ones (which he thinks are of less interest in *some* respects than old ones, and wishes other 'collectors' did the same), but to form some idea of their former abundance and history.

Pernis apivorus (*L.*). Honey Buzzard.

There can scarcely be any doubt that an irregular, if not an almost annual, migration of this species takes place to districts or localities within the area of the drainage basin of Moray. We have already, in a previous volume of this series, noted several occurrences of this fine bird upon the east coast of Sutherlandshire, from the Ord of Caithness southward,[1] the localities mentioned being Uppat Woods, near Dunrobin, in July 1879, and a young bird in September of the same year, which had the down still adhering to the tips of the feathers, shot near Balnacoil.

Since that volume was written we have seen another specimen of the Honey Buzzard, which was killed at Balblair, Inverness-shire, on October 14th, 1889. It was curiously marked, and spotted on the back, and the breast was white; it was the handsomest specimen we ever saw. Another, a male, was killed in June 1890 in the Black Isle, and was sent to Macleay, Inverness, for preservation.

In East Ross the Honey Buzzard has bred once, at all events, to our certain knowledge, two eggs being now in our collection at Dunipace. Concerning these eggs, the following particulars may prove of no small interest, as we are not aware that another Scotch clutch exists in any collection.

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[1] Vide *Fauna of Sutherland and Caithness*, p. 172.

According to our correspondent, the birds had frequented this wood for five or six summers previously. On 3rd June 1871 he assisted in harrying the nest, which contained two fresh eggs, and these were sent unblown to Captain (now Colonel) H. W. Fielden. The birds had been seen about a week before the day on which the eggs were taken. The nest, which was as large as a Rook's, and lined with wasps' nests, was placed in the fork of a Scots fir. After the eggs had been taken the old birds were seen flying overhead, but not before. Our informant believed that the birds left the wood about the middle of September.

St. John never met with this species in Morayshire.

Naturally enough the range of the Honey Buzzard in our present area is restricted to the more wooded parts; it occurred at Invergarry in 1878, the most outlying locality we have any note of, the lower-lying woods being more visited by it, but the Invergarry plantations are of large extent, well grown, and might easily have attracted such a bird at that time.

Honey Buzzards have been killed in several instances in June and July. In July 1882 one was killed at Brodie, near Forres, and another at Dunphail, about ten miles farther south; in June of the same year two were killed at Cawdor, on the 19th and 26th, and on the latter date another was killed at Belladrum.

One was killed on the Eildon Hills, near the Priory of Pluscarden, in 1867, and another, a male, was killed at the same place in 1868 by Mr. Georges, keeper, and this one is now in the Elgin Museum; and in 1883 one was obtained at Culloden.

Brown of Forres, who has had a good many through his hands, considers it an accidental straggler, but our data above would indicate a more decided line of migration; and were they not persecuted they would oftener remain to breed. Brown, writing to us under date of 5th July 1888, says:—'I was preserving a male Honey Buzzard, and expecting to find wasps in his stomach, and was not a little surprised to find the eggs of

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[1] Two other localities where the Honey Buzzard has bred in Scotland are Aberfeldy and Ballogie (Gray, *Birds of the West of Scotland*, p. 49).

a Wood Pigeon instead. The eggs were quite fresh, only the shells were broken. This bird was being pursued by Rooks when it was shot.' Mr. Brown adds :—'I am afraid he robs the nests and eats the eggs of many birds.'

We have other records of the Honey Buzzard killed in summer from different parts of our area, but these, we think, are sufficient to show that, were the bird unmolested, it would in all probability become a fairly common breeding species. The earliest record we have of this species is that of one killed at Carr Bridge in May 1855, but it is quite likely that before that date it may have been overlooked.

Falco islandus, *Gmel.* Iceland Falcon.

St. John mentions that a large light-coloured Falcon bred at Invergarry, quite different from the common Peregrine, and adds:—'This seems very like the Iceland bird, which is a rare visitor. I have only known of two other instances of its being seen in this part of the kingdom. One of these birds was hunting about the Loch of Spynie early in March. The Falcon was shot at, and fell, but recovered, and escaped us. The other I saw a year afterwards near Elgin, and a fortnight after the time that I saw her, one was killed in Ross-shire—in all probability the same.'

There are several entries in Macleay's ledgers of these birds, but it seems doubtful to which species they really belong.

Falco candicans, *Gmel.* Greenland Falcon.

A Greenland Falcon was shot near Helmsdale in 1882, and is now in the possession of Mr. Hill, banker there. Another, in our possession, was shot near the head of the Helmsdale strath, at Griam-a-Corry, by the forester, J. Macpherson, in 1889, as it was eating a grouse. The bird had only one leg.

In *Rod and Gun* of November 28th, 1889, it is mentioned that Mr. Ireland, head keeper at Skibo Castle, Dornoch, shot a Falcon, pure white, with the exception of a few feathers. A female was killed at Muirton, near Inverness, about September 24th, 1864, by R. Ainslie, Esq. of Elvington (*Edin. Roy. Phys. Soc.*).

Gray, in his *Birds of the West of Scotland*, p. 22, mentions a specimen taken near Elgin in 1865, and which passed into his possession. Dr. Gordon informed us that this bird is now in the Elgin Museum.

Falco peregrinus, *Tunstall.* **Peregrine Falcon.**

The Peregrine is still fairly common in deer-forests, but is shot down on every possible occasion on the grouse-moors. From the numbers that are sent in to Macleay's in Inverness to be stuffed, it is a wonder the bird holds its own as well as it does. Resident, but scarcer in winter on the higher grounds, many, probably the younger birds, coming down to the lower grounds in the autumn. About the end of April or beginning of May the Peregrine 'crop' commences to be gathered, judging from the numbers annually sent in at that time for preservation to Inverness; after and before that time they are quite scarce.

They still breed, among other places, at Invergarry, and we have also seen them not far from Guisachan, evidently nesting in 1892, but they are not common in these localities, though they are preserved as far as possible by the proprietors of these two places, as they are also in Sutherland.

Peregrines used to breed at Troup Head, on the Banffshire coast, and between Burghead and Lossiemouth, and also on the sea cliffs of the Black Isle, but have ceased to do so in the latter place for many years. It still breeds in the Sluie Rocks on the Findhorn, where it has done so for many years back.

Dr. Gordon says:—'Many specimens have at different times been killed at the Falls of Glenlatterach, and especially in 1834-5-6-8, where one or two were annually obtained by Mr. Foljambe' (vide *Zoologist*, 1847). It occurs also along the Covesea coast, whence we have seen specimens, and where the old site has been pointed out to us by Brown of Forres.

The Peregrine is rather uncommon over the lower districts of Moray, and even in the Carn districts of Spey and Findhorn. Still, if we desired to do so, we could give a goodly list of places where they are still found nesting, and quite a long list of rocks where formerly they did so. Higher up the country, among the Cairngorms and Monadhliath mountains, they are still far from uncommon. The Peregrines still breed annually quite low down in the valley of the Findhorn, in a very ancient stronghold, and also in the country between Findhorn and Carr Bridge. In Badenoch and Lochaber, and high up the tributary streams of Spey, they are far from uncommon, and several rocks are known to us to be still frequented around Loch Errochd; they occur, indeed, all over the lower rocks of the higher ranges, and we possess eggs from some of these eyries.

Amongst many more eyries, a few may be mentioned to show how widely it is—or was—distributed:—Troup Head, Delnabo, Strath Avon, Glen Nethy, Glen Feshie, Gaick, Loch Dhubh, Badenoch, Loch Errochd, Monadhliath mountains, and on Nairn, Findhorn, and Dulnan, and in many other localities.

Many specimens exist in local collections, and its name, whether as a nesting species or as shot during vagrancy, is included in almost all the many local lists we have had placed at our disposal, and which are quite too numerous to require special notice; and it is not unfrequently observed or shot in the vicinity of the favourite haunts of wild-fowl, such as Loch Spynie, where Captain Dunbar-Brander has procured it.

We have often witnessed fine flights of falconry in our Scottish Highlands. On the 10th August, over Loch Errochd, a female Peregrine attacked a Lesser Black-backed Gull, and kept dashing at it for quite a quarter of an hour, the Gull crying out loudly all the time, but finally escaping, the Falcon giving up the chase.

Falco subbuteo, *Linn.* Hobby.

A very rare bird in our present district. Two have been killed in Banffshire, as recorded by Gray in his *Birds of the West of Scotland*:—'July 1863, in which year one was obtained at Rothiemay in Banffshire, its second occurrence in that county, one having been killed about twenty-three years ago near the town of Banff.'

Falco æsalon, *Tunstall.* Merlin.

The Merlin is not a particularly abundant species in the Moray area, as far as we can ascertain; it is mentioned in lists from most of our localities, but generally entered as scarce.[1] At Guisachan it is rare, and at Invergarry Mr. Malcolm says it is 'very occasionally to be seen, and I am almost sure it nests, as I have noticed young birds. I have the skin of a hen Merlin which was shot about 200 yards from our house, attempting to carry off a half-grown Pheasant.'

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[1] Hector Boece in 1527 speaks of 'Merlyonis' as inhabiting Scotland generally (see under Goshawk).

Brown notes the Merlin as 'rare' near Forres.

Edward mentions the Knock, the Bin (Huntly *or* Cullen ?), Auchindoun, and Ben Rinnes as breeding localities in his time, but it is marked 'rare' by Smith. It still holds its own on the wilder grouse-muirs of the interior, and is a frequenter of the Carn districts of Spey and Findhorn, but not in such numbers as formerly. It still exists sparingly as a breeding species on the high lands inland from Troup Head and the North Aberdeenshire cliffs. It is rare now in the district around Forres, except when *vagrating* along the coast in autumn or winter. It is still not uncommon in the Carn districts of the Ladder Hills of Glenlivet, as we are assured by both Hinxman and Mr. Petrie, gamekeeper there; and it breeds also up near Loch Builg.

In 1893 Hinxman discovered the eggs of the Merlin in an old Crow's nest, in a tree above Inchrory in Glen Avon—a situation somewhat unusual in Great Britain, though not uncommon in Lapland and Northern Europe. At least two pairs were nesting that year within a short distance of Inchrory, one of them in long heather.

Falco tinnunculus, *L.* Kestrel.

A breeding species, decidedly rarer in winter in most districts, and entirely absent at that time from the higher grounds. Dr. Gordon and T. Macpherson Grant agreed that it was common at all seasons of the year in the cultivated districts of Morayshire. It is often seen about rocks and precipitous cliffs, where it builds, as for instance at Covesea, etc. (Dr. Gordon, *Zoologist*, 1847).

Although still not uncommon, the Kestrel seems to be getting much scarcer than formerly, and this is remarked by all with whom we have spoken on the subject; indeed, the bird will soon be quite rare in the lower-lying parts of Moray if the present rate of decrease continues.

The Kestrel is quite common, and even abundant, in the glens and 'glacs'[1] of the Carn district, and not so universally tormented by keepers as it used to be, many of whom now realise that they do but little harm to game, and considerable service to the farmers. This at least is the case in the more enlightened districts. We sincerely trust the lesson will be continued to be taught, and learned over the whole of Scotland.

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[1] Narrow ravines.

Pandion haliaëtus (*L.*). Osprey.

Of the Osprey's present breeding distribution throughout Scotland it is not within our '*Province*' to speak here in detail. Suffice it to say we are not amongst those who believe in more than three, or at the most four, sites which can be claimed as 'permanent residences' in Scotland. Of a far southern locality, which some collectors desire other people to believe is occupied, in order to mislead them in their attempts at 'finding damning facts,' we have the very best authority, we consider, that no Ospreys have bred there since 1860 certainly; but that it was present there some years previous to that date seems to be equally certain.

Nothing relating to our Ospreys would give us greater pleasure than to hear of other permanent eyries, but we prefer to keep such information as we possess, about even the alternative sites which are from time to time used, as we may look to these perhaps as offering the best chances of allowing our Ospreys to recover their numbers in the future.

With one exception, our present area of Moray includes all the breeding sites of the Osprey that are left to us, and embraces also a large proportion of the many old deserted localities of which we have any knowledge.

Ospreys seem singularly sensitive to disturbance, more so, we think, than are eagles—Golden Eagles at any rate; and a locality, especially where there is no alternative site, once deserted, is rarely again occupied.

All through our area many old sites are known to us. In the north we may include three, and, we are sadly afraid, we may now have to add, under the heading of deserted sites, another which, until within the last year or two, was regarded as occupied. Particulars of some of these old sites will be found further on. Despite all these facts, we have good reason for supposing that at least two pairs still breed regularly within our area, north of the

Caledonian Canal; and we sincerely trust that the proprietors' efforts to preserve them in their last strongholds may meet with success.

As long ago as 1856, we find notices in Macleay's old ledgers of Ospreys having been sent to him for preservation, and these, judging from the localities and the dates given, would probably have been birds shot either in the breeding season or at their breeding sites,—very often the two combined.

Mr. G. R. Lawson informed us that he saw an inhabited nest in Glen ——, close to Loch ——, on June 30th, 1880. In his letter he says:—'I saw the old birds, and as one of them occasionally went to the nest, I concluded there were young birds. One of the keepers told me they bred there every year, and that strict orders had been given for their preservation. This nest was built on an old fir-tree which had been partially uprooted by a storm, and lay out at an angle from the face of the hill, which is pretty steep.'

Mr. A. Ross, keeper at ——, writes to the effect that 'The Osprey builds not far from here, at a place called L——, in Glen ——, and again at a place on the south side of Loch ——, in both cases in a fir-tree' (1893). One of these places mentioned by Mr. Ross is doubtless the same as that referred to by Mr. Lawson.

In reference to a site in Ross-shire, which had been occupied for at least thirty years previous to 1893, we have received the following information:—

'I may state that five or six years ago I found the eggs of the Osprey at the bottom of an old Scotch fir, that stands half-way up a rock on the shore of Loch ——, and on the top of which tree their nest was placed. The eggs were pierced and empty. I concluded it was the work of the Hoodie Crow. The Osprey laid other two eggs, and brought the young ones up; and they have hatched out the young yearly since. I have not seen more than three or four eggs in the nest. The rock was burned, but it did not molest (*sic*) the birds, as the tree is much higher than the undergrowth. They were here, and nested last season' (Mr. Fraser, *in lit.* 3/iii/93). We visited this site in July 1894, in company with Mr. E. Caldwell, for the purpose of having a sketch made of it for this work, which, however, from various circumstances was never finished.

The tree in which the remains of the nest now are—for the original tree was blown down—is a small, stunted Scots fir, most of the branches being dead, with the exception of those on which the nest rests. There appears to have been three or four trees of the same kind near to each other. The tree stands on the slope of a hill, amongst long heather, and in very rough and rocky ground, and can easily be looked down upon from the rising ground above. There is a fine view over the loch; and as the loch itself contains large numbers of pike, no doubt that proved one of the attractions of the place to the Ospreys, as from the habit of basking in shallow water in summer, this fish is easily seen and secured; and no doubt it is owing, in some measure, to so many lochs in the wilds of Inverness-shire containing pike, that Ospreys were so abundant in this district as compared with other parts of Scotland. We are sorry to have to add, in regard to this site, that 1892 appears to have been the last season they bred there, as only one bird was seen either in 1893 or 1894; and they certainly did not nest in either of these years. At the same time, the birds *might* be expected to return, and the keeper assured us that he had strict orders to look after them, though from the appearance of the place, and the fact that the ground is used as a sheep-run and not as a forest, this seemed to us rather a difficult thing to be done efficiently.[1]

A letter appeared in *Rod and Gun* for May 6th, 1891, signed by 'An Old Keeper,' in which the writer stated that he had taken the young Ospreys from a nest, at or near a loch in Inverness-shire. In answer to our inquiries the editor informed us that 'An Old Keeper' was only a casual correspondent, and he did not know his address, so that we could discover nothing more about this breeding site.

The late Lord Tweedmouth wrote to us that 'The Osprey built on a tall small-girthed Scotch fir within twenty yards of the carriage-road, and did so while the road was being made—about twenty-five years ago. This tree is situated about a mile west of Guisachan House. The young birds were taken during several seasons, and sent to Lord Hill at Hawkstone. They flourished, after fish was given to them in place of rabbits by my advice. At that time another pair of Ospreys nested annually at a shooting-lodge ten miles from Guisachan House. I sent the young birds from here one season to the "Zoo," one of which is still alive. Wolf made a drawing of the young birds, which is now at Guisachan' (*in lit.* March 30th, 1892).

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[1] In an old journal, dating 1868, we find it noted that the two old birds of this nest were shot about the year 1865, and at that time—as our informant tells us—they had bred at the same place for many years previously.

We saw the tree mentioned above in 1892. At the present time, of course, there is not a stick of this nest to be seen, but the tree is a strong healthy one, and all its branches seem to be alive. We were informed that a bird is still occasionally seen in the district, probably a straggler from another glen.

In another letter from the late Lord Tweedmouth, dated February 2nd, 1893, he wrote that 'the parent birds continued to occupy the nest and rear their young for some years afterwards' (*i.e.* after he had ceased taking them for Lord Hill), and that 'there were two pairs about the same date in the vicinity.'

At Loch ——, in the western part of Inverness-shire, a pair of Ospreys were known to breed for fourteen years in succession, but this was some time previous to 1892. In 1890 and 1894 only a single bird—a female—was seen. Before this they never seem to have been molested, as far as we could ascertain They were, however, frightened away, as the Ospreys bred on an island in a loch in which was a heronry, and the lessee gave orders that the herons were to be destroyed. This was carried out by the keepers, and the mere presence of man there, let alone the constant firing off of guns, proved quite sufficient to drive the Ospreys away. With reference to this same locality, in 1891, the Osprey built a nest on the single small tree in a very small island, but in 1893 there was not a stick to be seen. Even where undisturbed, we were told the birds never increased.

Ospreys are still occasionally seen on a loch on the water-system of the Great Glen, and a pair bred there in 1883 or 1884. The eggs were taken, however; and this being the first time this site was ever occupied, the birds have not since renewed the attempt. Until Sutherland is reached, a loch in the north of Ross-shire seems to have been their northernmost locality.

From information placed at our disposal by Mr. Heneage-Cocks, it is satisfactory to know that, as late as 1893, there was one occupied nest in a western locality; two as late as 1892; one other taken possession of by eagles about five years ago,—say 1889 or 1890; and in 1891 an Osprey was seen collecting materials for a nest. All of these were situate within our present area. In the interests of the birds we do not reveal the more exact details which were given us.

At no time within this century does the Osprey ever appear to have been abundant in Strathspey, and probably not more than three, or at most five, sites were permanently occupied. From all the evidence obtainable we are almost irresistibly led to the conclusion that the wide valley under the shadows of Cairngorm was the cradle of the race, and that the sites there and at Loch an Eilein were occupied later by the same pair of birds occasionally shifting their quarters.

Even so long ago as Colonel Thornton's time, Ospreys do not appear to have been abundant within the districts which that gentleman traversed in search of sport, because he says (*Tour*, p. 43):—'These birds are very rare; in all my different excursions I never *heard* of any, except at Loch Lomond and at Loch Morlaix in Glenmore.' We know, of course, they were not really so rare as the passage would perhaps lead the reader to believe, but it is at least worthy of note that Colonel Thornton does not appear to have seen or heard of them at Loch an Eilein.

In 1824 the geologist MacCulloch wrote of the Ospreys of the Castle of Loch an Eilein thus:—'The Eagle has built his eyrie on its walls, etc.' (*The Highlands and Western Isles of Scotland*, vol. i. p. 400).

The Ospreys' eggs taken by Roualeyn Gordon-Cumming, and sold at Stevens' sale (J. C. Stevens' Sale Catalogues, No. 2652, June 4, 1866) were taken previous to 1843, and again after 1850; between these two dates Roualeyn was in South Africa. Some of these eggs were, as is well known, taken at Loch an Eilein.

Carruthers, writing in 1843, in his *Highland Note-Book*, p. 133, speaks of the continuous occupation of the Castle by 'Eagles.' He says:—'She'—the hen—'has long been a denizen of the ruined tower, and still remains.'

In Thomas Macpherson Grant's letter to Dr. Gordon of October 1844, he says:—'Besides Loch an Eilean in Rothiemurchus, there are lochs in Badenoch where it regularly breeds, and I have in my collection a fine male from Loch Inch on the Mackintosh and Ballindalloch estates. I also heard from the fox-hunter residing in Abernethy that several pairs bred in the forest there, the nests being constructed in old pine-trees, isolated by the pent-up waters of the artificial timber-dams.' Many old sites were visited by us in 1892, but we cannot come to the conclusion that so many pairs as are above indicated occupied the said area continuously.

From L. Dunbar we have received a detailed account of his experiences of Ospreys in Strathspey. After carefully comparing his MS., which was written out for us from memory in 1892, with the more indelible records from the notes and egg-books of Messrs. Hancock, St. John, Milner, and Wolley, and letters from and to these gentlemen—some from Dunbar himself—and thereafter by further comparison with a former MS. of Dunbar's, written in 1886, also from memory—an account which had been laid aside about that date,—we are able to give a very fairly accurate account of the Strathspey Ospreys between the years 1846 and 1852.[1]

In 1892, Dunbar and Harvie-Brown visited Loch an Eilein together, and sat down on the very spot where the former used to land after swimming out to the old castle for the Ospreys' eggs, which expeditions took place between the years 1848 and 1852.

Dunbar remarked to Harvie-Brown that once during that period the birds deserted the loch, because in that year the timber which had been cut along its shores was being floated through the loch and down the river. Little of the older timber exists there now, but the parts nearest to the loch have been replanted. That year the birds deserted Loch an Eilein; they built at Loch Morlich, and Dunbar took their eggs there. One year both these sites were occupied by Ospreys, and he again took the first layings from both the nests.

After most careful consideration and all inquiries of every one we could consult, Lewis Dunbar and Harvie-Brown could not make out that there were ever more than three or four pairs of Ospreys in Strathspey even in their palmiest days—sixty, eighty, or a hundred years ago,—though there are many more old nesting sites.

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[1] Lewis Dunbar informed us that—'Any notes I had on ornithology were all lost in the great fire of Sandridge, Port Phillip Bay, in 1855, where my wife and I lost everything belonging to us: we had nothing left except what we stood in.'

At that time old '*roy*' (*i.e.* red-barked) and green pines filled the whole slope three-parts up the south face above the shore of Loch an Eilein, and no doubt the old pines stood also at the far west end, as depicted in the foreground of MacCulloch's painting. But at the present time only a few stragglers remain, some of which are gaunt and grizzly and bare, and many yet still either '*roy*' or green, but old enough to claim their ancient right as sentinels of the army of the pine-trees which formerly pressed over the skylines into the neighbouring valleys.

Dunbar also told us, as the floods of old memories came back, that although there were Jackdaws in the cliffs of the neighbouring hills and in the adjoining old limestone quarry on Torbain at that time, there were *none* in the castle itself. At the present time there are a number about the ruins, and we saw a pair sitting on the edge of the Osprey's nest in May 1892. Neither were there any trees growing inside the castle which were high enough to show above the top courses of the masonry. Now the walls are overtopped by ash and elm saplings by some five or more feet.

From the comparison of the different MS. documents, letters, and other materials at our disposal, we believe the following is as nearly as possible the correct chronology of the Ospreys of Loch an Eilein since 1844, when, as we have seen, Thomas Macpherson Grant wrote to Dr. Gordon regarding them.

In 1845 and 1846 we have no contemporary records, and only Lewis Dunbar's recollections, in which he, however, adheres to his statement that this date—1846—was the first year of his attempts to take the Osprey's nest. We have, in conjunction with Professor Newton,—who has been much interested in the whole subject, and has greatly assisted us in working out the chronology, and taken an infinitude of pains regarding the whole matter,—arrived at the conclusion that in this point Dunbar's memory is at fault, and that it was not until 1848 that he first swam out to the island. Contemporary facts go far to prove this.

Dunbar's account of the first year's proceedings is as follows:—'1846 (*recte* 1848) was the first year of my attempts to secure the Ospreys' eggs on Loch an Eilean. On a bright April day I walked from Grantown to the loch, swam in, and explored the old castle, getting my bare legs stung by nettles, and finding the best and easiest way of climbing to the nest. I climbed up and secured three eggs, which I put in my bonnet, and placed the latter on my head, and took to the water again; and on reaching the shore a woman at the gamekeeper's house saw me and quickly fled inside.[1] I dressed, and made off for Glenmore Forest, and found there a very large nest in an old fir-tree. I then went to the keeper's house, and he informed me it was an old Goshawk's nest.'

So much for Dunbar's relation, really applying to 1848.

These eggs were sent to St. John, who was, during that year, in Sutherland. This same year also L. Dunbar took eggs from the nest on the old ruined lodge at Loch Morlich[2] (*Ootheca Wolleyana*, §§ 83, 85), and it was in this year that old Sir John Peter Grant, grandfather of the present laird, died.

In 1849 Dunbar took eggs on 24th May which were sent to Mr. John Hancock (*vide* Howes' memoranda from the Newcastle Museum), and the same year he took the eggs at Loch Morlich from a nest in an old Scots fir-tree (*Ootheca Wolleyana*, § 85). In 1850 (Dunbar's 1886 MS. says):—'Still stuffing for Mr. Snowie and collecting in summer-time—taking eggs in Loch an Eilean'; and in his 1892 MS. he says:—'In that year Mr. Hancock met me, and we started on a nesting tour through Abernethy, and landed at Rebhoan (Revōăn), the nearest house to Cairngorm, which we made our base of operations. We visited an old dam at the head of the river Nethy which had been made to collect water as a reserve for the summer season, to float down timber to the saw-mills which had been erected on the bank of the river. On the edge of this dam we found two old Ospreys' nests on two very stunted and blasted fir-trees, the branches all growing to one side by the force of the wind blowing down the glen, and the nests placed right on the top of the bunch of branches. Mr. Hancock took a sketch of both trees and nests. Next day we made for Loch Morlich, where an Osprey bred on the chimney of an old burnt-down shooting-lodge, situated at the east end of the loch. I climbed up, and found only two eggs in the nest, and therefore left them. Mr. Hancock was very anxious to get the old bird, so I was put in ambush, while the two accompanying me walked away about half a mile. I had not long to wait, and as the hen was coming down to the nest I shot her with a walking-stick gun, which I invariably carried, left her on the ground where she fell, and secured the two eggs. By this time Mr. Hancock came up, and took a sketch of the bird as she lay dead on the ground, and with broken wing; and this bird and sketch (coloured) I afterwards saw in his house in Newcastle, after I returned from Australia. On dissecting this bird when he got home he found another egg, beautifully marked, and quite ready for laying.'

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[1] The same thing is said to have happened to Roualeyn Gordon-Cumming on a like occasion.

[2] By notes in the late John Wolley's MS., and communicated by Professor Newton to us, it appears that Wolley first knew Lewis Dunbar in the spring of 1848, and that introduction was made through his brother, William Dunbar, Wolley having first heard of him from the Milners, who were in Sutherland. On the 3rd May 1851 Wolley received two eggs from L. Dunbar which had been taken at Loch an Eilein on 29th April. Also, Wolley had three eggs from L. Dunbar in 1852, taken at the same place; and in 1851 he had an egg from a nest on Loch Morlich, which nest was harried three summers by Lewis Dunbar, who is the 'correspondent' mentioned in *Ootheca Wolleyana*, §§ 83, 84.

In 1851, Dunbar says in his 1886 MS., 'opened shop on my own account; stuffing, and taking eggs on Loch an Eilean.' In his later (1892) MS. Dunbar rather confuses the incidents of the two expeditions, and we here prefer to give the more certain records of Wolley's notes, as prepared from his letters and other materials by Professor Newton, when editing *Ootheca Wolleyana*, Part i., and which he kindly has placed at our disposal for purposes of this volume.

Then in 1852, Dunbar took the eggs again at Loch an Eilein—for the fifth time—on 8th May, and the three eggs were sent to Wolley in London with a letter; and on this occasion he put his hand on the female's back. He was accompanied by his cousin from Carr Bridge.

In 1853, under date of 10th March, Dunbar wrote to Wolley, in which letter, while promising to send the Osprey's eggs should he be successful in procuring them, he adds: 'If Roualeyn comes to the north this season, which undoubtedly he will, I am afraid I shall run a bad chance.' Wolley did not get any in that year, and as Roualeyn took eggs in 1852, after Dunbar, it is believed the Ospreys were absent from Loch an Eilein in 1853. In this same letter Dunbar announced his intention of going abroad, which he did, in the autumn.

Now, harking back to 1847, Dunbar's 'Reminiscences' make it appear that he took eggs from an old blasted pine at Loch

Morlich, but again we consider his date is put back. However, it is certain that he took eggs twice before he visited these Osprey sites with Hancock in 1850 (*q.v.*)—a date about which there can be no doubt.

Again, in his 'Reminiscences' Dunbar says:—'For some years previous to this date the Osprey bred in a solitary fir—a very old tree—within a quarter of a mile of the north-east end of Loch Morlich, which was bleached as white as paper, and without any branches except stumps, except those on which the nest rested. The former branches of the trunk were reduced to stumps with age. On arriving at this tree this season it was very windy, and I could see the ground for nine feet on the windward side heave up with every breeze. I climbed to the nest, but could make nothing of it from the outside owing to a great projection, so I had to try and make a hole in it to get at the eggs, which cost me about two hours' work, but at last, and by dint of great exertion, I succeeded in getting through, and found three eggs. When at work, and expecting at every heavy breeze that the tree and I should go together, I made up my mind, if I did go, that I would stick to the tree until near the ground and then spring off. However, I got safely down, but some time afterwards it was blown down, which caused the birds to take to the chimney of the old shooting-lodge. Mr. St. John wished to have a sketch of the tree, which I took from memory, and sent it to him along with the eggs. I also visited an old breeding-place of the Osprey—a little lochie between Glen Feshie and Loch an Eilean. The nest was in a fir-tree by the side of the loch. It was a big old nest, which had been forsaken for some years.[1] I gave all the Ospreys' eggs I secured to Mr. Hancock, with the exception of one nest I sent to Mr. St. John, and two nestfuls to Mr. J. Wolley in 1845 or 1846' (*in err.* for 1851 or 1852)—besides eggs from Loch Morlich in 1851, A. N., v. *Ootheca Wolleyana*. 'The birds,' says Dunbar, 'always laid a second time every season after I had taken them (i.e. *the first clutch*), with the exception of the time I killed the old bird for Mr. Hancock at Loch Morlich, and which I was very sorry to do. As Mr. Hancock made a gift of his private collections to the Newcastle Museum before his death, I suppose that bird and both eggs are there.'

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[1] This old tree has since been cut down.

Here Dunbar's full notes end. They were received by us 15th February 1892.

Before continuing our chronology, we must now refer to the other material we have received regarding the Strathspey Ospreys, which fixes our dates of Dunbar's narration more definitely than his memory permitted of.

By a reference to the *Ootheca Wolleyana*, p. 63, it will be seen that Wolley received the Ospreys' eggs from Lewis Dunbar on May 3rd, 1851, and April 29th is given as the date on which they were taken. Of other slight discrepancies that occur, we think them only such as might arise naturally from the long interval between Dunbar's adventures and the date of his writing them down from memory. Such as these are, however, it is well to put them in as clear a light as possible.

On application to Mr. Richard Howe (Nat. Hist. Mus., Newcastle-upon-Tyne), that gentleman obligingly informed us (*in lit.* 26th May 1892) that—'There are fifteen eggs of Osprey in the Hancock Collection. Twelve are from Scotland, of which the details attached to the eggs are here given:—Nos. 1, 2, 3 were taken out of a nest on an island on Loch an Eilean in Rothiemurchus—a district of Strathspey, 24th May 1894. Nos. 4, 5, 6, Loch an Eilean, May 3rd, 1850 (signed, "L. Dunbar" on each egg). These six eggs are remarkably large and finely blotched. One egg out of a nest in a tree by the side of Loch Morlich in Glenmore, May 23rd, 1849 (not the date of receipt!).' There were two young birds in the same nest (as the last-mentioned single egg) just hatched (see letter from Mr. St. John to Mr. Hancock below). It seemed the birds removed their young to another place after 23rd May, probably to the ruins of the old shooting-lodge, at the east end of Loch Morlich. In Mr. Howe's transcripts it appears that Hancock received this single egg from St. John, along with a letter and a rough sketch of the tree, made (*from memory*) by Lewis Dunbar. St. John says:—'I enclose young Dunbar's sketch of the tree and Osprey's nest. Your single egg came out of it. [*Note*:—This egg does not appear to be in the collection now.] He came back the next day and found that the old birds had removed the two young birds to another nest, where they formerly bred in a ruined castle. But on his climbing to this they removed them again, and he had not time to find out where. Is not this very interesting? They built on the tree this year (1849), for the first time for seven years, having for the last seven years bred on the ruin to which they removed the young, as I mentioned. They were only just hatched.

'On the back of the pencil sketch of the tree, as drawn by Dunbar, is written the note—"The height of the tree is about forty feet. It is a fir-tree, and it is bleached as white as paper with age, and without any bark as far as my recollection goes. This sketch is as near it as possible.—L. D."'

It was from this nest also that the egg mentioned in *Ootheca Wolleyana*, p. 65, § 85, was obtained in 1851, and sent to Wolley, and subsequently was given, along with another, to J. D. Salmon. This egg was taken by a shepherd; but W. Dunbar informed Wolley that his brother, Lewis, had three times robbed this pair of birds. 'The first year Lewis took it from the ruins of a shooting-lodge, the second from a dead Scotch fir-tree, and the third year (1850) from the old lodge again, when the hen bird was shot by him, who lay in wait and shot it with a walking-stick gun, in company with a gentleman, Mr. John Hancock, who sketched it as it lay dead.'[1] In Lewis Dunbar's narration it will be seen that three persons composed this party. 'In 1851,' continues the account in *Ootheca Wolleyana*, 'a new lodge was built close against the old one. There was another nest several years ago in a tree, which my informant knew of, and made a drawing of it, as well as he could, for the same gentleman. The following year my informant (*i.e.* W. Dunbar) sent me another egg of the Osprey, but from what locality he was unable to make out. 'The egg is now in Mr. J. P. Wilmot's collection' (vide *Ootheca Wolleyana*, p. 65, § 85,—'One, Inverness-shire,—1851).'

In regard to the nest taken on the chimney of the old shooting-lodge at the end of Loch Morlich, Mr. Howe quotes, amongst other items:—'Two eggs were in the nest, and we shot the old female, and she had in her an egg, full size, but not shelled (compare Dunbar's narration). A portion of a trout was lying on the side of the nest when taken. The lining of the nest was composed entirely of small tufts of fine grass and lichens, and was about seventeen inches across. This was only the lining of the nest, the full diameter being twice this measurement. Most of the sticks which formed the outer part were one inch in diameter.' Signed J. H.

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[1] All these notes referring to these *single* eggs relate to the same locality—a pine-tree, 'bleached as white as paper with age, etc.,' 'by the side of Loch Morlich.'

Of the stuffed bird in the Newcastle Museum the label says:—'Mature female (Osprey) shot at the nest in Glenmore, 18th April 1850. Nest and two eggs of this specimen in cabinet.'

Finally, we again remark that the few differences here found in the two accounts emphasise the general correctness of the whole.

The date of Dunbar's last visit to Loch an Eilein appears to have been 1852, and since then we have not succeeded in obtaining any precise data of the history of the Ospreys either there or at Loch Morlich, although we have tried in every direction. Not one of the letters of Wolley's Scottish correspondents refers to Ospreys, as we are assured by Professor Newton, who believes he has all these letters, between 1853 and 1859—the year of Wolley's death,—and Wolley himself 'was certainly under the impression that Ospreys had ceased to exist as breeding birds in Scotland.' Professor Newton continues:—'Whence his impression arose I can't say, but he was not a man hastily impressed. He, *i.e.* Wolley, may have taken to heart, more than was needed, the home-slaying done by W. Dunbar and St. John, of which of course he was aware; but so it was, and never having heard anything to the contrary, I appended to More's paper in the *Ibis* (1865, p. 9) the note which drew from Rocke (*op. cit.* p. 360) his remarks. Rocke is dead, and I can't say to which nest he referred, but I am inclined to think that it was the Loch an Eilan one.[1] It should be borne in mind that Lewis Dunbar was, as far as my knowledge goes, Wolley's only Osprey correspondent, and therefore upon

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[1] Professor Newton's appended footnote to M. A. G. More's paper on 'Distribution of Birds in Great Britain during the Nesting-Season,' above referred to, runs as follows:—'We doubt if the Osprey has bred in Scotland for more than ten years' (*loc. cit.*). This elicited a letter to the editor (Professor Newton) from Mr. John Rocke, in which that gentleman says:—'I am happy to be able to inform you that this interesting species still breeds regularly every season at a locality in Inverness-shire, which, for prudence' sake, I forbear to name' (*loc cit.*).

The locality referred to is now undoubtedly unoccupied, and had nothing to do with the Strathspey nesting sites, as is evident from the reference to Lord Hill and our previous remarks (*antea*, p. 75), as supplied by Lord Tweedmouth. This therefore does not help us to fill up the hiatus between 1852 and 1859 or 1872, referred to in the text (*ut sup.* p. 75), and relating to the Loch an Eilein and Glenmore birds.

Dunbar's leaving for Australia, all connection might be said to have been cut off' (Professor Newton, *in lit.* 24/iii/1890).

In 1867, however, Gray, upon the authority of Mr. H. J. Elwes, states that there were 'at least three or four breeding stations in Ross-shire, and that these are strictly protected' (*Birds of the West of Scotland*, p. 18).

In 1869, we are informed by Gray (*op. cit.*, p. 18), that eggs of the Osprey were taken in the breeding season of that year, 'but,' he continues, 'the birds laid a second time, and were allowed to hatch their young in safety.' This is given upon 'Mr. Brown's' authority in the text, by whom we believe it is Harvie-Brown who is meant, but a determined search among our papers has hitherto failed to elicit further details of the facts so stated, though such may appear amongst correspondence left by Gray, to which we have not access.

In 1872 our friend, Mr. Thomas H. Maclachlan, under date of 13th September, *in lit.* describes the nest and annual resort of Ospreys on a small loch in Inverness-shire visited by him a few days previously.[1]

The *Scotsman* of June 9th, 1879, contains a long article upon the Ospreys of Loch an Eilein, in which it mentions that one of the birds was shot in 1872, the birds having occupied the site undisturbed certainly previous to that date, and thereafter it remained tenantless till 'this spring'—*i.e.* 1879. The writer of the article then relates that he visited the loch 'recently' with a friend, and saw the female bird rise, with a scream, off its nest, and then graphically describes its aerial motions and gyrations.

In the numbers of *Good Words* for April and September 1880, there are articles by William Jolly, Esq., Her Majesty's Inspector of Schools, on the breeding of the Ospreys at Loch an Eilein, where—he tells us—'at that date they were strictly preserved.' Mr. Jolly also refers to another breeding-place near the same locality, but this being less known, and less safe, according to Mr. Jolly's opinion, he so far wisely repressed the name. But it has been truly remarked:—'It was not until Mr. Jolly described it (Loch an Eilein) and the Ospreys in *Good*

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[1] At this time he seems to have ascertained that the Ospreys 'seem to be undisturbed, and breed there every spring' (?).

Words (1880) that it attained a national reputation' (vide *The Cairngorm Club Excursions*, July 14th, 1890, p. 26, *q.v.*). We doubt if this 'national reputation' has done any good to the birds, but has rather only destroyed '*the solitude which the birds like.*' We ourselves think there is only cause for regret in this publicity, *as then given, for the first time.*☞Now, it is for lovers of our native fauna and flora to see if the resources of *true* civilisation cannot avert the consequences which, even as we write—alas!—are in operation.

Mr. Jolly says:—'All went well with the feathered clan till seven years ago'—*i.e.* about 1872 (see *supra*), 'when a noble lord, filled with the noble thirst for slaughtering our wilder innocents, wantonly shot one of the birds, and frightened the shyest of Eagles from the home of his ancestors. The nest has been deserted till the present year, when a pair once more risked their lives in the old castle tower.' The *Scotsman* had deprecated this act as wanton, and this was repeated by Mr. Jolly, but a little 'humble searching after truth,' both on the part of Mr. Jolly and of the *Scotsman*, would probably have disclosed the fact, that the act was not premeditated, but perfectly accidental and unintentional; and though the fact might be deplored, there does not appear to have been any justification whatever for the severe remarks quoted and accentuated. The 'noble lord' was the late Earl of Stamford, and we consider that we hold the best authority for the fact that it was done 'entirely by mistake.' Lord Stamford was the then shooting-tenant of Rothiemurchus, and none regretted the accident more than himself. A bird rising from a deep mountain burn overshadowed by trees, and fired at by a quick snap shot, might puzzle any one to identify before the fatal trigger was pulled.[1]

On a blasted pine on the north-west shore of the same small loch, which is close to Loch an Eilein, the Ospreys, since then, made an attempt to build a nest, the remains of which were still visible in April 1893, and of which, at that time, under the belief it was the true nesting-tree, Mr. Norrie and Harvie-Brown took photographs. It was about seven or eight years previous to that date that the birds made this attempt, no doubt in consequence of the other nesting-tree having been blown down. This site was never used, nor probably the nest ever finished. A path passes close to this tree, and old roots of forest pines—many no doubt of those cut down at the time already mentioned, between 1846 and 1852—are visible everywhere.

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[1] Another cause for the gap here occurring in our chronology is *popularly* believed to be the cutting of timber both at Loch an Eilein and elsewhere, and the floating of the same away, causing continuous disturbance at the nesting time. But in this connection see what is said under our prefatory remarks to Dunbar's narrative, *antea*, p. 77, which no doubt places the date of the timber-cutting at a still more distant date, and which really refers only to a temporary desertion of the hereditary stronghold, when the birds repaired to a tree on the south-east shore of Loch Gamhna, which tree was blown down about 1879.

In the first article in *Good Words* is an effective view of Loch an Eilein and the castle, from photographs taken by Mr. Jolly and his companions; and in the supplementary paper—'A Second Glance at the Osprey in the Highlands' (*Good Words*, September 1880), another nearer view of the nest in the occupancy of the old and young birds, copied from a sketch by Mrs. J. Blackburn, is given, showing the peculiar manner in which the old birds carry their prey.

On September 14th, 1879, our friend Mr. James Stirling of Garden, Stirlingshire, sent to us an account of his visit to Loch an Eilein, when he saw one young bird, and a young gull beside it, picking up fragments of fish-food which had been left; and Mr. Stirling also informs us that he also noted that two were reared in 1880.

In 1881 Messrs. J. Young and Rawson of London visited the site and saw the birds there.

In 1885, the Rev. W. Forsyth, D.D., Abernethy, assured us that Ospreys bred in Abernethy forest in a giant solitary pine, *until quite of late years*: and he added (*in lit.*) :— 'It is doubtful even now (1885) if the Loch an Eilean pair is the only pair in the district.'

The Ospreys formerly had a nest on the top of an old pine, about two miles or less above Forest Lodge on the Nethy (already noticed), of the stem of which a portion is still standing. It is a solitary old monarch of the forest; and stands on a grassy meadow, on the right bank of the river Nethy, about one mile above Forest Lodge.

In 1887, Ospreys' eggs were taken from the too easily accessible ruin of Loch an Eilein, in order to feed the maw of an insatiable egg-shell collector. Previously to that date the birds had been as carefully preserved as it was believed possible by the late proprietor, Sir John Peter Grant, who died in 1892.

In 1888 three old birds appeared at Loch an Eilein, and a fierce battle between two of them resulted in the death of one—a female—as we will immediately relate from the testimony of an eye-witness of the fight. There were no eggs laid there that year, but the surviving birds shifted to another loch in the neighbourhood and succeeded in rearing three young. We were told by a trustworthy correspondent, with reference to this same alternative locality, that until of quite recent years (prior to 1890) Ospreys had bred there, but the nest was so constantly robbed that the birds deserted; as we will shortly see was the case in the years 1887, 1889, and 1892. Now, we believe that we know where the eggs taken during these years went to, and who took them, and, in one case at least, we may be thankful that not only the eggs, but also the whole nest and both birds were not annexed also!

In reply to inquiries addressed direct to Sir John Peter Grant, his younger son, Mr. Charles Grant, wrote to us as follows in 1892:—'I went to ——,[1] who saw the affair, and send you the substance of his account.

'About 3 P.M. on the 7th April 1888, he observed two Ospreys fighting desperately, near the castle, whereon the nest is built. . . . They were fighting for possession of the nest. After a combat of two hours,[2] one bird succeeded in holding the other under water until it was drowned. My informant marked the spot on the shore, to which the dead bird was floating, and brought it to my father, who had it stuffed, and it—a female—is now in the hall at The Doune.

'In the evening of the same day a male bird arrived, supposed to be the mate of the conquering hero; and next day a second male bird, supposed to be the mate of the dead bird, arrived on the scene. The two males fought furiously also, but the end of the contest was not observed. One bird returned to Loch an Eilean, but both it and the hen, after a few days, left the nest, and occupied one of the alternative sites, and there succeeded in rearing a brood of three young birds.' Mr. Grant adds :—' They built again at the same place in 1890, but have made no determined attempts to return to Loch an Eilean, though they have several times been observed there fishing. The story is a little involved, and I have not been able to get at any real facts beyond these I have mentioned.

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[1] This refers to one William Grant, a tailor, who witnessed the encounter, and who is since deceased.

[2] From another account, substantially the same, it would appear the fight had been spread over several days.

'Lord Winchelsea, who is a naturalist, told me that he thought it possible that the fish-bones and offal might have made the old nest in the castle unpleasant for the birds, on account of the breeding of vermin. The nest is of very old construction, and this may be the cause of its being deserted.[1]

'About seven years ago the nest was deserted for three years or so. I hope the birds may now again build in the castle next year, but they do not get much encouragement, I fear. There is an annually increasing body of tourists, who visit the loch and district, the solitude of which the birds like. One was shot, I believe entirely by mistake, by the late Earl of Stamford, who was the shooting-tenant at the time—about ten years ago—say 1879, *q.v.*—but am not sure. The taking of the eggs has been done to my knowledge, in spite of all possible precaution.

'No boat is allowed on the loch, except one, which cannot be used without my father's consent, and along with a trustworthy man. We should be very glad to see these noble birds back. There is a curious old local tradition, which predicts that the Grants will cease to possess Rothiemurchus when the Ospreys cease to build on Loch an Eilean castle.'

In 1889, William Evans, when residing at Kincraig, saw both birds fishing in Loch Insh, and they were also frequenting Loch an Eilein, but he was told that they were breeding at another small loch, upon a fir-tree on an islet. This was incorrect, or purposely intended to mislead; and, all the circumstances being considered, we do not blame the endeavour to conceal the true site, his informant not knowing at the time that his information would have been perfectly safe with that gentleman. One of the several alternative sites that year was chosen, but the money of the tempter and the local knowledge of the tempted again proved too much for the poor birds, the sum offered and taken having been a sore temptation to any man, whether a stranger or a servant.

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[1] In this opinion we cannot coincide.

In 1890 Ospreys bred in Rothiemurchus, but not at Loch an Eilein. Eggs had been taken at Loch an Eilein and the birds were harassed by shouting tourists, waking the echoes of the old castle, and the birds therefore shied the place.

In 1891 the Ospreys certainly did not breed at Loch an Eilein, and it would seem that they, as well as other birds of prey, often do not use the same nesting-place every season, but only in alternate years. In this year, 1891, an alternative site was used, and the eggs were taken.

In 1892 we visited this site, and were told that it had not been used for ten years; however, from information we then possessed, and from further evidence we were afterwards enabled to obtain, we doubted the truth of the statement; for they almost certainly bred at *this* locality in 1889, when the eggs were also taken, and in which year both birds were seen daily fishing in Loch Insh.

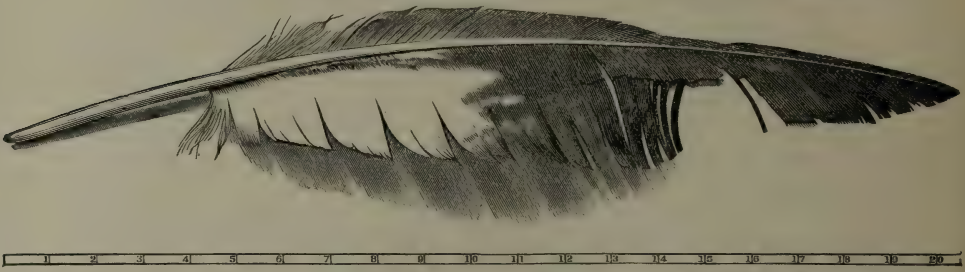
In 1892 we learned that the Ospreys had returned to Loch an Eilein; but later in the same year we heard that they had been disturbed there, and had left again. A keeper on the Rothiemurchus property had told us, on the 15th May, that the nest on the Castle had been blown down; but Dunbar and Harvie-Brown visited the place on the same day, and saw plenty of nest, and one very white Osprey was seen in the distance. It flew far away from water.

There were five or six pairs of Jackdaws in the castle, and we saw one pair sitting on the edge of the Osprey's nest.

In May 1892 we sketched a new nest in an old pine, emptied, however, of its contents—we believe, *that very morning*,—and a dropped tell-tale first primary feather, now in our possession, picked up beneath the tree, with shot-shattered web, and seared mark along the inner web of the feather—alas!—told a miserable tale to our senses, all alive as they were, for impressions, in the interest of the moment.

On the same day also we visited another old nesting site far removed from water, placed on the top of a wind-bent pine amongst tangled heather and juniper, at which a considerable remnant of the nest was still visible. We made a rough sketch of the tree and nest, which is situated in the centre of the great Rothiemurchus pine woods. The nest was not thirty feet from the ground.

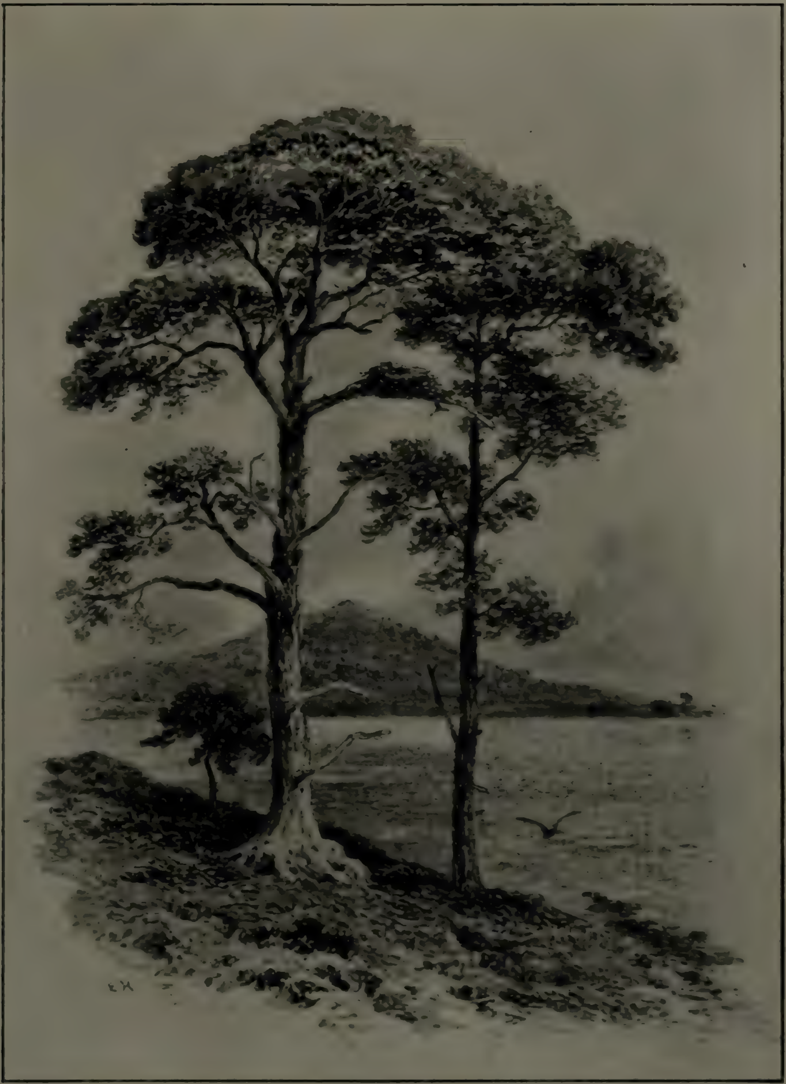
Of the Osprey outside of Spey area, but yet within the southern portion of the Moray Basin, we know of three shot in the valley of the Deveron within the last few years—before 1892. No wonder our Ospreys have a hard struggle for existence! We are glad to be able to say that, partly owing to our bringing the presently known facts regarding the number of pairs of Ospreys remaining in Scotland, as occupying nesting sites, before Professor Newton's notice, steps were taken by the Council of the Zoological Society of London, which will, we hope, while rewarding the present representatives of the Grant family of Rothiemurchus, and the present laird of Lochiel, for the preservation accorded to the Ospreys' nests upon their properties—at the same time add incentive to further efforts, and still firmer protection of these now rare British birds, not only at Loch an Eilein itself, and other adjacent alternative sites, but also in all other localities, where they may at any time reappear at long since deserted haunts.



OSPREY'S WING FEATHER (1st primary) picked up on 16th May 1892 by J. A. H.-B., below the tree where the new nest was.—*From Photo by* Mr. BROWN *of Falkirk.*

The following is a list of these birds obtained upon the Deveron:—

One was shot by the keeper there—Shewan by name—at Lower Cabrach, about August 1889. It came into the possession of Mr. Legge of Huntly, who took it away with him to Japan. The bird had caught a large trout in the river, and had alighted on the hill-side to devour it, when the keeper stalked and shot it. Is this another link in the chain of destruction of the Loch an Eilein Ospreys?



OSPREY'S NEST OF 1892, ON THE DUKE OF RICHMOND AND GORDON'S PROPERTY.

Another was shot at Meyen, on the Lower Deveron, by the keeper there, in 1890.

The third occurrence was at a farm opposite Dunbennan Hill, Middle Deveron, but as some doubt remains as to the identity of the species, and repository of the specimen, we do not give particulars.

In 1893 the Ospreys returned to Loch an Eilein about their usual time—*i.e.* between the 10th and 16th of April.

And now, at this eleventh hour, before going to press, we may be allowed to rejoice in the restoration once again of the Ospreys at Loch an Eilein in 1894.

Hinxman, who has always taken deep interest and given active advice as regards the future preservation of the birds, and who was resident at Inverdruie in May, whilst in prosecution of his duties in connection with the Scottish Geological Survey, informed us :—'An Osprey has put in its appearance at Loch an Eilein. On April 25th, Colin Phillip—who has been staying with me—and I saw the bird sailing round and settling on the castle. The old nest has been nearly destroyed by the Jackdaws, but I hope the Ospreys are going to build there again. When I return to Aviemore on Tuesday, I will find out whether both birds have been seen, and I will keep you informed as to future developments.'

In his next communication our friend tells us as follows :—'The Ospreys appear to have paid a flying visit to their old nesting-place on Sunday, April 15th, but did not settle down there until the next week. By April 23rd they were quite established on the castle. The hen bird began to sit about the middle of May, and when I left the neighbourhood, on June 14th, was still sitting hard. She is a beautiful bird, with an almost completely white head.'

Mr. William Douglas also sent us the following interesting notes, dated 13th June :—'I was very lucky at Aviemore in getting a good view of the Osprey. The hen had then (June 3rd) been sitting on eggs for two weeks. As we approached the loch, she rose from the nest and circled round and round the old castle uneasily, but as we remained quietly hidden behind trees, she settled again, as we watched her movements through a glass. While we were there, the male bird also came sailing up, and I got a "snap-shot" at him with my camera, just as he alighted on the nest—but I fear the distance was too great.'

The triumph of the safe hatching off is thus related by Mr. Hinxman under date of September 9th, 1894:—'I was pleased to hear on returning to Rothiemurchus last Thursday, that the Ospreys had hatched out all right. From this house, which is nearly opposite the island, I see the young birds—of which there appear to be two—about the castle constantly, and apparently taking little notice of the numbers of people who are passing along the road continually just now. The old birds do not show much. The people here tell me that when the young were in the nest, the old ones used to fish in this loch, feeding the young early in the morning and in the evening, but that now they go to Loch Insh to fish.'

Again, on the 28th September, Hinxman writes to us:—'The young birds seem to have left for good. They have not been seen nor heard since Sunday, September 23rd, when one of the old birds appeared, and apparently took them off with her. The date of their first appearance in spring is very regular—between April 4th and 6th. Last year only one bird came, and stayed but a short time.'

It is with great satisfaction we are thus able to conclude our history of the Loch an Eilein Ospreys, and we are delighted to be able to add that the laird of Rothiemurchus is determined to do all in his power for their future safety.

The following announcement from the Council of the Zoological Society, which appeared immediately after its issue, in the *Scotsman*, and many other daily papers, will show that the interest now attaching to our rarer birds is receiving wise regard and impulse, so that their presence amongst our fauna is now approaching 'National Importance,' while at the same time stimulating private individuals to still greater exertions in their behalf. Personally, we believe no worthier object can be found, as a mark of regard and encouragement by a great and wealthy society like 'The Zoological Society of London,' than this rewarding of individuals and proprietors who have struggled hard to preserve our *raræ aves*, thus contributing towards the pleasure of hundreds of British tourists and sight-seers, and also, very substantially, towards the incomes of local innkeepers, and others who are in great measure dependent upon the harvest of gold and silver which is poured out during our short Scottish tourist season. We sincerely trust that the resources of *true* civilisation will be all effectual for the future in preventing the greed, the unpatriotic gluttony, and ungentlemanly wholesale bribery of otherwise excellent servants, and may obtain the support and annual encouragement, not only of our great Societies, but also, if need be, of our Government in Parliament assembled.

The following is the text of the Zoological Society's announcement given out on the 30th April 1893, as appeared in the *Scotsman*, *Oban Times*, *Inverness Courier*, and *Elgin Courant*:—

'The considerations which prompted the Council of the Society, as announced in their report read at the annual meeting of 29th April 1891, to award two of its medals to the representatives of families through whose exertions the Great Skua has been retained as a veritable member of the British fauna, have induced the Council to act this year in like manner in regard to a still scarcer species—the Osprey (*Pandion haliaëtus*). It has been represented to the Council that for some years past but three pairs of this bird, which on many accounts is of great interest, have regularly bred in Scotland, and that their protection has been an object of much solicitude to those on whose property the nests are built. The Council are able to state that the effect of their former award has not only been beneficial to the birds concerned, but has been highly appreciated by the public at large, and they trust that the same good result will follow the bestowal of the Society's silver medal upon Donald Cameron of Lochiel and John Peter Grant of Rothiemurchus, in recognition of the efforts made to protect the Osprey in their respective districts.

'These medals will be presented to the above-named gentlemen at the general meeting of the Society on June 22nd.'—(*Report of the Council and Auditors of the Zoological Society of London for* 1892. April 28th, 1893, pp. 5-6.)

In conclusion, we would suggest several methods for the better protection of the Loch an Eilein birds, if we may be allowed, so far, to interfere in the interest of the species.

War should be carried to the bitter end against the Jackdaws around Loch an Eilein. Every south-country Scotch gamekeeper knows and avenges upon them their pilfering and destructive habits. The Ospreys cannot stand their annual annoyance, and having their labours of nest-building to renew each year, whilst even their eggs are not safe; any keeper in the South can vouch for their oophilous kleptomania.

The boat should be entirely removed from the loch, or securely padlocked, between March and September, to prevent surreptitious use being made of it at night.

The nest should be watched from the first advent of the birds each April until the young are hatched out, or longer if necessary, and a watcher might be paid—beyond the possibility of bribery—a fixed sum for every successful hatch off of the young, over and above his wages, for three months. And any servant who allowed preventable disturbance of the nest should be discharged or otherwise punished by fine or reduction of wage.

The castle itself might be guarded with barbed wire—a fencing material detestable under most circumstances but legitimate in this case—both underneath the surface of the loch, and above it if practicable,—and we cannot conceive any great difficulty in laying it in a practical manner. A second *chevaux de frise* might encircle the walls of the castle itself.

To the placards put up warning tourists against lighting fires, might be added another Estate Order, viz.—'No Shouting to the Echo,' and 'No Disturbance of the Ospreys can be allowed during the months of April, May, June, July, or August'; and the watcher or watchers have instructions strictly to prevent any such 'wilder tourists' passions let loose.'

By no means should guns be fired in the neighbourhood of the loch by keepers or servants, or any one, *between the dates of April 1st and September 30th.*

Neighbouring proprietors should aid in their preservation, and be assisted therein by the County Councils.

Just while these last proof-sheets are passing through the press, we hear again of the successful rearing of the Loch an Eilein Ospreys, and the successful attempt to photograph the Castle, nest and birds, by Mr. O. A. J. Lee. The young hatched out sometime in the third week in June, and appeared to be fully fledged by the 28th July.

Order **STEGANOPODES.**

Family **PELECANIDÆ.**

Phalacrocorax carbo (*L.*). Cormorant.

Local Name.—Scratt.

Resident, and common along the coast-line. Cormorants breed on the Nigg rocks, and also on the rocks about Cromarty. They are quite common visitants to many of the larger lochs and rivers, and about Invergarry are said to be quite 'plentiful.'

One recorded by Mr. Hoy was shot at Gordon Castle, October 12, 1816, by Mr. L. Gordon. 'It had dived into the Spey and caught a *finnock*, and as soon as its head was above water it was shot dead. It was carried down the stream some little way, and when taken out it disgorged the *finnock* alive.'

A Cormorant was obtained as far inland as Dallas after the severe gale of 1879. It has been seen as high up the Spey as Cromdale on 6th, and again on 17th September 1891, by William Evans, and has also been obtained on several occasions on the river Deveron. Edward quotes it as 'frequent, except for a short time in summer'; and Smith includes it in his list. One in Duff House Museum is a very fine bird in full summer dress, which was caught on a line below the cruives at Duff House, on the Deveron. It is included in all lists along the coast districts, but naturally less commonly in inland lists.

Perhaps the farthest inland locality from which we have positive record of its occurrence is one seen on Loch Ovie in Upper Badenoch by Charles H. Alston in August 1890.

Another was seen to frequent Loch an Eilein for a time in 1879.

Phalacrocorax graculus (*L.*). Shag.

Local Name—Scart.

Common most seasons of the year along the coast, but not so abundant as the Cormorant, nor do we know of its breeding anywhere in our district south of the Ord, though Mr. Millais saw a good many young birds frequenting the rocks about the Sutors in May.

Edward has it, 'only occasional'; included in Smith's list, and specimens are in the Banff Museum. We have not noticed it ourselves anywhere except near Gamrie Head. It occurs very rarely, or never, inland, and is not included in Dr. J. O. Wilson's list, nor any other list from inland localities which has reached us.

Sula bassana (*L.*). Gannet.

Occurs along the coast, mostly in spring and autumn; at times we have seen them fishing very close in to shore.

The Gannet occurs occasionally inland; such as one recorded in 1820 at Moss of Rothes, fifteen miles inland, and a young one killed near Forres in 1856.

Edward speaks of it as a spring and autumn visitant, and 'occasional in winter'; and Smith says, 'occasionally found dead inland after severe gales from the north.'

Order **HERODIONES.**

Family **ARDEIDÆ.**

Ardea cinerea, *L.* Heron.

Local Name.—Lang Craiget Heron.

Very common, but more often seen on the shore in winter than in summer, food being more plentiful there than farther inland. Herons breed on the rocks at Cromarty, as mentioned by St. John as far back as 1845. Booth says that in 1869 there were some hundreds of these birds at these same cliffs, and then he was not acquainted with more than one or two other similar localities in Great Britain where Herons build in such situations.

These birds build in the woods about Loch Brora, and there is a heronry in the woods about Skibo, on the Dornoch Firth.

Inland breeding localities are more numerous, such as in Glenmoriston (*fide* Duncan M'Lennan, Guisachan). Herons are, however, subject to a great deal of persecution, on the ground that they injure the trout-fishing. One very fine heronry had been almost destroyed at the time of our visit in 1892, and although there were only one or two pairs left, the keepers meant to finish off even these, of course acting under their master's orders.

'There is a heronry about eight miles from here (Struy) on an island in Loch Mhuilinn in Glenstrathfarrar. The Herons build at one end of the island, and there is a rookery at the other; they make a nice noise between them when a hawk or any other enemy makes his appearance' (A. Ross, *in lit.* 13/ii/93).

South of the Ness they were at one time considered to be in greater abundance than they are at the present time. Edward says:—'Now a few small spots where they breed, but which hardly deserve the name of heronries.' The Heron is however still common, generally dispersed, and resident. The *O.S.A.* mentions amongst its few records, Alvah (L. D.), vol. iv. p. 393; Kirkmichael, Glen Avon, vol. xii. p. 450; and its name is invariably included in all local lists.

In Lord Teignmouth's *Reminiscences* (vol. i. p. 305),[1] he says:—'I found the ancient castle of Darnaway in Moray tottering in the estimate of superstitious neighbours, who prognosticated ill as the consequence of the seeming departure of the herons.' In 1844 Dr. Gordon spoke of the heronry at Findhorn as 'now deserted.'

Of heronries of the present day, we may mention a few. On the Deveron at Turriff, on the estate of Hatton, there is a small heronry; and when the young are able to fish for themselves, many are to be seen along the course of the river in July, as far up as Rothiemay. There is also a small heronry at Leith Hall, Kennethmont.

On Avon there is a small heronry below Drumin, which is protected by Sir George Macpherson Grant. The birds go far up the glen, well amongst the mountains.

In Altyre woods there is a small heronry, a branch-remnant of the once famous Findhorn heronry,[2] which has shifted ground. Higher up the Findhorn is another containing about fifteen pairs of birds, not far from Tomatin House. A pair bred close to Sluggan Bridge, near Carr Bridge, and had done so for many years previous to 1891, and many other single pairs are to be found breeding in the district. At Tomvaich plantation, as we are informed by Mr. J. G. Thomson (*in lit.* 21st April 1891), a heronry has existed for about twenty years, and now consists of eight nests, in Scots firs, having slowly increased in the numbers of its inhabitants.

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[1] *Reminiscences of Many Years*, by Lord Teignmouth. Edinburgh: David Douglas, 1878.

[2] St. John remarks that the Herons were leaving this heronry in 1850, and in 1863 they deserted altogether, mostly on account of the robbery of their eggs by Jackdaws. This heronry would appear to have been formed during the lifetime of the grandfather of the present Sir William Gordon Cumming.

In Strathspey there is an old heronry at Carnacnuic[1] in Abernethy. We saw two young birds from this heronry in the possession of Mr. Grant, the landlord of Nethy Bridge Hotel, in 1891.

The bones of a bird allied to, but not those of, the Common Heron, have been so identified by Professor MacGillivray, which were sent to him from the 'Gypsies' Cave' or 'Tinkers' Cave' near Hopeman (*Fauna of Moray*).[2]

On Netherdale estate, in the Log Wood, four or five Herons are regularly seen to frequent it, but as we were informed by the keeper—Frazer—only one nest is built, and that not every year; young were hatched off in 1892. And on Laithers water of the river Deveron—a little lower down than Netherdale—there is a favourite haunt of the Herons, probably the same birds, on the shallows which lie above the salmon pools called 'Upper, Middle, and Lower Heron.' This is a lovely bend of the river, and we have often seen the Herons catch their breakfast of small fish, wading in as deep as their thighs, and standing 'stockstill' till their prey came within reach. Formerly a pair of Herons bred in the hanging-wood which overlooks the 'Upper Heron' pool of the Deveron, but when most of that wood on Laithers estate was cut, they left, and took up their abode in the Log Wood on the property of Netherdale. After a time, and in the present year—1895—two pairs successfully reared their young in another wood on the same property, possibly the nucleus of a future heronry!

Ardea purpurea, *L.* Purple Heron.

One is supposed to have occurred about thirteen miles from Banff, and is thus recorded by Edward:—'My late friend Rev. Mr. Smith saw fragments of the bird some time afterwards (*i.e.* after it had been shot), and believed it to be of this species.' One was shot near Lochnabo in 1888 (*Fauna of Moray*, edition 1889, p. 56).

Botaurus stellaris (*L.*). Bittern.

A rare visitant to the northern part of our area. One was killed at Balnagowan in March 1856; another at Corriemony, at the head of Glen Urquhart in 1861, as we find entered in Macleay's ledgers.

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[1] Sometimes pronounced *Carnacruinch*.

[2] We have failed to trace these remains to their present resting-place.

South of the Great Glen, St. John, in his *Natural History of Moray*, p. 301, mentions one instance of the Bittern having occurred at the loch of Spynie, and in a footnote on the same page there is mention of another killed at Lochnabo, but in neither instance is the date of capture given.

We were informed by Macleay that a Bittern was obtained on June 20th, 1884, by Lieutenant Frazer at Flemington, near Fort George, and was sent to be stuffed.

Edward says :—'Three or four of these birds occurred. One in the Museum was killed near Banff about twenty-four years ago, another in the Moss of Park, and one or two at Balvenie (valley of the Fiddich).' Smith testifies also to the bird in the Banff Museum being the one 'shot in 1831, near Banff.' Another, shot on Duff House policies, is now in the collection in Duff House (*auct.* Mowat, keeper there, and seen by us in May 1891).

One was shot near Turriff, Aberdeenshire, in 1891, and another at Loch Spynie 'about four years previous to 1885' (*auct.* Captain Dunbar-Brander), and this is doubtless the same which is recorded as killed there in February 1879 in the *Fauna of Moray*. At Loch Spynie Bitterns are seen occasionally—Captain Dunbar-Brander thinks perhaps once in every five or six years. A bird was sent to George Sim, Aberdeen, for preservation, from Elgin, 'last week' (George Sim, *in lit.* November 24th, 1888). In 1891 one was shot by Mr. Dennistoun's keepers on 19th November, as it rose from the bank of one of the ponds near Culmoney House (R. Thomson, Ferness, *in lit.* 21/v/92). From the above records, it will be seen that the Bittern is far from uncommon along the south shores and districts of the Moray Firth, and no doubt there are others of which we have no notes.

Botaurus lentiginosus (*Mont.*). American Bittern.

About December 1888 a male of this species was obtained about two miles from Pitgaveny, and Captain Dunbar-Brander identified it. A gamekeeper got it stuffed, and when he went away it was sold amongst his effects for 7s. 6d. (Captain Dunbar-Brander, *in lit.* December 1889). Later on, Captain Dunbar-Brander writes in reply to inquiries :—'The American Bittern was shot at Lochnabo, by the under-keeper there. The head keeper at Innes (Dempster) got the bird stuffed. When he left, it was sold at his sale, and bought by the Westerton keeper. The latter went to

Ross-shire, and took the bird with him, and I tried to get the bird afterwards, but failed.'

Family **IBIDÆ.**

[**Plegadis falcinellus** (*L.*). **Glossy Ibis.**

Edward claims to have seen three one day, but did not get a shot at them.]

Family **PLATALEIDÆ.**

[**Platalea leucorodia**, *L.* **Spoonbill.**

Edward gives place to it thus:—'One found in a ditch in a wood near Banff by *a young naturalist.*' Edward adds:—'It has since been found in this neighbourhood.' Would it be *too* severe to make the suggestion that the subsequent birds appeared—'pour encourager les autres naturalistes jeunes.' (The italics are ours.)]

Order **ANSERES.**

Family **ANATIDÆ.**

Wild Geese.

The *O.S.A.* mentions 'Wild Geese' only at Kirkhill, N.W. Dr. J. O. Wilson records flocks of wild geese as passing Huntly in spring, but not so plentifully of late years. The *Invergordon Times* says that in the shop of Mr. Hugh Munro, a merchant in Alness, there were on Monday last (date December 1881) no less than three hundred wild geese, the bulk of which were shot by Captain Spicer. It is added that Captain Spicer had been successful in taking down fifty-six geese with one shot.

When St. John wrote, previous to 1853, all wild fowl, and perhaps more especially grey geese, were far more plentiful than they are now, so that when we quote him his words must be understood to refer to that period. Since then, the more general use of fire-arms, and the greater extent of ground taken in for cultivation or planting, have very much altered all this, so that these birds are much rarer than formerly, and rank more as passing migrants than they did then.

A very large flock of wild geese passed Forres upon 20th April 1895, flying north-west; they numbered about two hundred (Brown, *in lit.* 14/v/95).

Chenalopex ægyptiaca (*Gmel.*). **Egyptian Goose.**

Obs.—Edward mentions it, but if correct probably only an escape.]

Anser cinereus, *Meyer*. **Greylag Goose.**

The Greylag still breeds in the northern part of our area about the chain of lochs at the head of the Helmsdale river, but, though protected there since 1875 or thereabouts, does not seem to increase. Mr. Baillie informs us that in 1893 these birds had left the lochs about Lairg and the head of Loch Brora, and that none had been seen by the keepers. They were common in the latter localities, to our knowledge, in 1877-9.

To other parts of our area it would appear to be only a rare, or, at least, a very occasional visitant. In the Dornoch Firth Mr. Jennings looks on it as a casual winter visitor. It has been seen at Fairburn, as Captain Stirling informs us. St. John says it is now rarely seen in the county of Moray (1847 ?), though it was, he was informed, once very common there.

At Forres, Brown says it occurs early in spring; and near the same place a flock of twenty-eight was seen by O. A. J. Lee on the 12th October 1887 (?).

The Geese passing over Huntly in spring are believed by Dr. J. O. Wilson[1] to be Greylags, and Edward says they have occurred, but other accounts speak of *grey geese* as being of rare occurrence: small flocks are seen passing in spring at Findhorn. The Greylag is included in Major Chadwick's list.

Anser segetum (*Gmel.*). **Bean Goose.**

A regular migrant in spring and autumn to the flat plains of Moray, according to St. John, who adds that their stay in autumn is very short as compared with what it is in spring. In autumn they arrive in October, earlier or later, according to the weather, and in spring appear as soon as the first oats are sown, about the 10th or 12th of March.

Anser brachyrhynchus, *Baill.* **Pink-footed Goose.**

In some notes sent us by Sheriff Mackenzie from Tain in April 1887, he says that this species occurs in considerable numbers upon the shores of the 'Morrich More,' lying between Tain and Tarbertness, during the month of April. On Tuesday, April 19th, 1887, one was shot out of a large flock which was feeding in a cornfield, and was identified by Sheriff Mackenzie as being of this species. The head was forwarded to us for inspection.

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[1] A belief very difficult either to agree with or differ from.

On October 12th, 1887, large flocks were seen to arrive near Forres by O. A. J. Lee. Major Chadwick says:—'Visits us regularly at the same time as the Bean Goose.'

The Pink-footed Goose is a common visitor to the fields bordering the Beauly Firth near Clunes, but only during the spring migration.

Anser albifrons (*Scop.*). White-fronted Goose.

This species has occurred at least once in the north-east of our area, viz., at Helmsdale (*Fauna of Sutherland and Caithness*, p. 309), and the head of the bird was sent us for identification. It seems to be a rare bird anywhere out of Morayshire, as we have only one other record of its occurrence outside that county, when one was sent to Macleay from Ryefield by Captain Warrand on October 25th, 1893.

St. John says that in Morayshire this species is a regular winter visitant, coming about the middle of October, and remaining about the same place, if not much disturbed, until its departure in spring; it is rather tamer than the other geese.

Brown of Forres shot a very beautifully marked example in the parish of Kinloss, near Forres.

Bernicla brenta (*Pall.*). Brent Goose.

Local Name.—Covesea Geese (pronounced 'Cowsie').

Brent Geese occur in all the estuaries from the Little Ferry southwards. Mr. Jennings remarks that though not common in the Dornoch Firth, they are very numerous in the Cromarty Firth in winter.

St. John remarks that the bird arrives as early as the end of September, and the flocks continue to increase until they leave in April.

It is included in Major Chadwick's 'list of the Birds of Culbin.' They are called '*Cowsie Geese*,' owing to an old erroneous idea that they bred there[1] (*auct.* James Brown). Brent Geese literally swarm during some winters—as, for instance, 1890-91—in Findhorn Bay, almost covering the surface of the water, and were but little disturbed. It is said that as recently as 1885 they were of much rarer occurrence. Brown, however, seems to consider that all kinds of geese are now on the decrease in Findhorn Bay. They were extremely abundant in the Cromarty Firth during the severe winter of 1894-95, and some of the 'punters' made very heavy shots.

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[1] They could not breed there, as the skerries are tide- and wind-swept, unless, indeed, the local name arose from the old belief that Geese grew out of barnacles.

Bernicla leucopsis (*Bechst.*). **Barnacle Goose.**

Not a common visitor even in St. John's time. One was shot in the Beauly Firth in February 1886 (M. L.). At Forres it is rare, according to Brown. In August 1887 O. A. J. Lee saw five near Forres; he fired two shots at them, about sixty yards off. They were seen again next day, and one appeared to be wounded.

One shot at Carndhu, Knockando, is now in the Museum at Thurso. Major Chadwick in his list of 1885 considers it as of rare occurrence. One, a male, was shot in the Moray Firth, and is now in the Museum, Edinburgh. It was purchased in 1881.

Bernicla canadensis (*L.*). **Canada Goose.**

On the 2nd of May 1887 there came to the bay between Burghead and the Old Bar of Findhorn a pack of Canada Geese, eighteen in number. Two were shot—one by Major Chadwick of Moy's gamekeeper. Brown of Forres saw them feeding on the Buckie loch, and also near the mouth of the Findhorn, about the middle of September. By October 1st only five were remaining.

Cygnus musicus, *Bechst.* **Wild Swan.**

We have had few notes of the Wild Swan sent us. One was killed at Invergarry in February 1853 (*Fauna of Moray*), and Captain Ellice writes us that they are occasionally seen on Loch Garry, probably attracted by some tame ones there, when the weather is severe. Mr. Jennings remarks that they are not rare in the Dornoch Firth in flocks of from ten to twenty, and in Sutherland they occur in spring on some of the larger lochs, but not regularly. Mr. Muirhead says they had been seen on Loch Ness, two or three years previous to 1867.

Brown says they are rare at Forres. In 1887, O. A. J. Lee saw some arrive there as early as September 28th. St. John mentions Wild Swans constantly in his work on Moray, and gives the loch of Spynie, Lochlee, and some fresh-water lochs between Forres and Nairn, as localities for them.

There is much evidence of the former occurrence of Wild Swans, both historic, traditionary, and as evidenced by the meanings of place-names. Amongst the latter we may instance Loch Alvie (Spey)=*Ealabhi*=Island of Swans (*N.S.A.*, vol. xiv. p. 81); and at the date of 1845 this loch is spoken of as being still frequented every year during spring migration by Wild Swans. Wild Swans are still migrants past Loch Spynie, especially during severe winters, when they remain longer, though St. John related of them that they were then (when he wrote) 'rare and decreasing.'

At the time of the *O.S.A.* about from twelve to eighteen rested on Loch Spynie, and in another place the *O.S.A.* says:—'Loch Spynie abounds with Swans.' Again, Swans frequent Loch Insh near Kingussie in winter, and the following other localities are quoted:—Drainie parish, Elgin, Kirkhill, and Rothiemurchus and Duthill.

Under the earlier conditions of the loch of Spynie, of course, as we know, wild-fowl were more abundant. We have thought it sufficiently interesting to illustrate our volumes with a cutting from an old map of Moray, which shows the area at one time covered by the loch.

Brown of Forres writes us under date of 10th February 1893:—'A large flock of Swans, all supposed to be wild—thirty-three in number—alighted to drink at the loch of Hatten in the parish of Kinloss, near Findhorn. They were on migration, and flying north-west. Two of them were shot at the loch by a rabbit-trapper. One of these examined by me proved to be a female Whooper in excellent plumage and condition. The pack appeared to be composed of old and young birds. The date of their appearance would be about the 20th January 1893.'[1]

Cygnus olor (*Gmell*). Mute Swan.

This bird lives in a semi-domesticated state in one or two localities in Sutherlandshire, where they were placed by the late Duke,[2] and specimens have been shot in a few instances throughout our area. Some of them have been, doubtless, escapes, but that is no reason for supposing that all are so.

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[1] It may be said that it is unnecessary to record so minutely appearances of Swans, or particulars of Swan haunts—as Wild Swans, A.D. 1893—are not such very unusually scarce birds. We have, however, already pointed out, that it is not by the judgment of present-day naturalists or observers that the values of these present-day records ought to be valuated, but by observers and naturalists of the future. We repeat it, because we observe there are some authorities who call such particulars padding, or designate them as unnecessary. We cannot think they are unnecessary, because even what 'everybody' knows, unless recorded at the time, becomes utterly 'amongst the things that were,' so utterly as to be quite lost sight of or, otherwise, distorted.

[2] *Fauna of Sutherland and Caithness*, p. 186.

Five of these birds appeared on Loch Flemington in the middle of January 1896, and two were shot. We saw one of them, a young bird, in Macleay's shop; it had lost a toe and a little of the web from the inside of the left foot.

Buffin's Skua.—Quite lately we saw the skin of an adult Buffin's Skua in Macleay's shop, which had been found in a dying state close to the targets at the 'Longman,' where the volunteers practice at Inverness, 'about five years ago' (*auct.* Simon Fraser, Jan. 1896).

Cygnus bewicki, *Yarr.* Bewick's Swan.

Less numerous on the Dornoch Firth than the Wild Swan (Jennings). One was shot at Teaninich, East Ross, in 1879 (M. L.).

St. John mentions them as occurring quite commonly along with the Hooper, but says there are rarely more than four or five together, eight being the largest number he saw. St. John specially mentions that he never saw a *grey* Bewick's Swan; all were pure white. An immature bird, shot by Brown of Forres, was sent to Harvie-Brown for identification, and he presented it to the Elgin Museum, where it is now housed. This one was shot in a 'dyke,' or deep ditch, on the 29th October 1889. There is another one in the Museum of Science and Art, Edinburgh, obtained on the Moray Basin, December 11th, 1878.

Cygnus immutabilis, *Yarr.* Polish Swan.

One was shot at Nairn, and was presented to the British Museum by Mr. Duncan Baillie of Househill, Nairn, 10/iii/64 (No. 72 of British Museum Catalogue). See also Yarrell, 4th Ed., vol. iv. p. 343.

Tadorna cornuta (*Gmel.*). Sheldrake.

A common spring and summer visitant, breeding on most of the sandy shores of the coast-line; some few remain the winter on the Dornoch Firth.

Sheldrakes seem particularly numerous along the coast from

Nairn to the mouth of the Findhorn during the breeding season, and we have seen great numbers of birds there, mostly in pairs, in May and the beginning of June, in many cases accompanied by their young.

The *O.S.A.* is silent. Edward says:—'Only in winter, and not in large numbers,' which may or may not be a mistake. They leave the coast of Aberdeen in the autumn, after bringing out their young, and in the adjoining area of 'Dee,' George Sim has never seen one in winter. However, we do not attach much significance to these facts, as, although absent at certain points of our coasts in winter, they are well known to frequent others regularly, their presence or absence being regulated by the nature of the feeding-grounds.

Brown of Forres saw a pure white Sheldrake in May 1895 on the shore near Forres. He examined it through his glasses, and is quite sure as to the identity of the species.

Tadorna casarca (*L.*). Ruddy Sheldrake.

Six Ruddy Sheldrakes frequented the Buckie loch near the mouth of Findhorn river, and one of them was shot by a salmon fisher. This was a female, and was preserved by Brown of Forres (*in lit.* 13th July 1892). This bird was seen in the flesh by George Sim. The exact date on which it was shot was 5th July; and Harvie-Brown also had an opportunity of inspecting it after it was stuffed.

A second specimen was shot in the estuary near Findhorn on the 19th October 1892, by Mr. W. A. Brown of Dundee—who was punting in the firth and bay of Findhorn—and he gave it to Brown of Forres. It is supposed to be another of the same flock of six originally observed.

Anas boscas, *L.* Mallard.

Resident and abundant. No part of our area is without this well-known bird.

The Wild Duck is very generally included in all lists as 'common'; 'abundant, especially in winter.' 'Very abundant along the river Deveron'; often nesting a long way from water and near the summit of Threeman's Hill near Rothiemay. Observed upon every reach of the Deveron, from the sources near the Buck of Cabrach to the sea.

A remarkable shot was made near Rothiemay in a small woodland pool of water greatly frequented by Wild Duck. The pool is in the centre of a large wood, and is not more than a few feet wide and about thirty feet long. Twenty-two were shot with four barrels, one day during the winter of 1890-91. This shows how easily a duck-pond can be formed almost everywhere where a water-supply can be obtained, and in any place where an acre of ground can be utilised, which possesses sufficient quiet and seclusion.

In the unusually early season of 1893 we witnessed a deliberate migration of a family party of Wild Duck, followed by a party of Teal, at the Upper Cabrach. Upon the 28th July, when fishing the Upper Cabrach burns, we saw six Wild Duck rise suddenly from a marshy spot—a part of the old river-course. They circled round, rising higher and higher until at last they reached a sufficient altitude. They then took a bee-line south-west by compass, and we watched them for about three miles, until, still heading over towards Glen Livet, they disappeared in the distance. Before they disappeared to our vision, three Teal, which we had seen before restlessly flying about, followed on the same track, and these too we watched as far as our eyes could follow them. Previously to this a party of six Dunlins had taken the same course.

Chaulelasmus streperus, *L.* **Gadwall.**

A very rare visitant to any part of our area. From the ledger of Small, Edinburgh, it appears that he received two from Morayshire in March 1859; a female was shot near Cromarty in January 1860, and was sent to Dr. A. Smith by Mr. Muirhead of Queen Street, Edinburgh (*Proc. Edin. Royal Phys. Soc.*).

Another was seen by us in the shop of Mr. Freeman, game-dealer, Inverness, in December 1892, and we were informed that it came from Munlochy in the Black Isle.

Edward speaks of it as a great rarity. One, a female, was procured on the Deveron by Dr. Leslie, about the time the Shoveller (*q.v.*) was picked up, and was the only one known to Edward at that time, and in December 1893 one was shot in the neighbourhood of the Moray Firth, as recorded by Rev. H. A. Macpherson (*Zool.*, vol. vii., April 1893).

Spatula clypeata (*L.*). Shoveller.

Mr. Jennings informs us that he has known a few instances of this species breeding on small swampy lochs in the neighbourhood of Tain, but he has never met with it in the winter.

St. John mentions that several pairs of Shovellers bred on the loch of Spynie, and that they frequent that place the whole winter.

The only place we have personally met with them is on the loch of Spynie, which is carefully preserved by the owner, Captain Dunbar-Brander. Here two or three pairs of Shovellers nest, and we put up several when going about in the punt. When rising, this duck makes a peculiar clapping noise with its wings, quite unlike any other species.

Messrs. Small, Edinburgh, had one sent them from Morayshire on December 5th, 1870.

Edward speaks of it as quite a rarity about Banff. In the latter part of the winter of 1837-38 a mutilated specimen was found amongst the rocks at Blackpot, on the coast.

Since Edward's time, however, the Shoveller has become more plentiful along the lands on the south shore of the Moray Firth. In 1879 Harvie-Brown saw and shot both old and young within the boundaries of the Deveron watershed, upon dams or ponds near Keith, in the month of August; they were associating at the time with other wild-fowl. They are known to breed regularly, and not uncommonly, in many parts of Moray. In 1885 there were from four to five pairs nesting on Loch Spynie, and the young birds of the year are not infrequently met with all along the Laigh of Moray (Captain Dunbar-Brander and W. S. Mackessack of Newton Struthers, near Forres), and in 1878 two pairs are recorded as having bred in the Loch of Cotts (*Fauna of Moray*, edition 1889, p. 33).

The Shoveller may be looked upon as a very rapidly increasing nesting species in many parts of Scotland, and especially of late years.

Dafila acuta (*L.*). Pintail.

Although mostly a spring visitor to the north-east of our area, and not a very common one even then, it occurs also in the autumn and winter. Mr. Jennings thus says that the Pintail is common and fairly numerous 'in severe winters' on the Dornoch Firth. A fine male was brought to him on one occasion from a locality near

Tain in April 1888; and he saw a young male that had been killed on the Cromarty Firth in October 1889. Specimens in his collections were obtained on Loch Eye, near Tain. Booth says that in the north-east of Scotland these birds associate with Wigeons, and are known locally as 'Wigeons' Leaders.'

In March 1851 two Pintails were sent to Messrs. Small, Edinburgh, from Morayshire, and Macleay received specimens from Dalvey, near Forres, in 1878, and from Cawdor in 1885. St. John says he has seen Pintails flying about the loch of Spynie in June and July, though he never succeeded in finding their nest.

Edward says:—'A fine male brought to him, shot on the Deveron.' This species is not represented in the Banff Museum. Smith says:—'The writer (*i.e.* himself) never saw one on the Deveron, but in 1830 one associated with a flock of Wild Ducks.'

Pintails have occurred in adjoining valleys of Moray, and have been received by Mr. George Sim, *in the flesh*, from localities such as Kingussie, far up the Spey, Dalvey, and Forres (rare); it is occasionally seen as a winter visitant on Loch Spynie, and specimens are also recorded from the Deveron (*Zoologist*, 1848, p. 2292).

Querquedula crecca (*L.*). Teal.

The Teal is a common bird in most parts of our area. From Mr. Muirhead's notes this species would appear to be very common on Loch Ness, especially where the Coilty river enters it at Glen Urquhart, and there it seems to be resident; probably this may be because Loch Ness does not freeze in winter. Mr. Jennings says it is resident and common in severe weather near Tain, though farther north we think it commoner in autumn, departing during the winter, and re-appearing again in February and March. It is one of the commonest ducks during the whole season on the Beauly Firth.

The *O.S.A.* makes several mentions of the species in Alvah (L. D.), Drainie, Elgin, and S.W. Moray. Edward says:—'Occasionally met with in winter.' Smith includes it as 'in great numbers' near the Bridge of Alvah, and it occurs in almost all local lists from Cullen on the sea and far up the several river systems, etc.

We would ourselves consider it *not extremely abundant*, but common around Rothiemay in winter, and occurring in scattered pairs high up the glens in summer.

Norman speaks of it as occurring in hundreds on the Culbin Sands, and we can credit the likelihood of this statement as regards the shallow lochs and puddles which occur there. 'Thinly distributed,' says Hinxman, 'a few breeding high up around the lochans at the head of Glen Builg in the Abernethy Forest'; and on the upper waters of the Livet, Fiddich, and Deveron, and the streams of the Carn District of Spey we have usually met with a few in the nesting season.

Obs.—One of the so-called Bimaculated Ducks was shot in the Beauly Firth by Captain Latour in 1860. It was stuffed by the late Mr. Macleay, Inverness, who packed it up and sent it to be exhibited at a meeting of the Zoological Society.

Querquedula circia (*L.*). Garganey.

Edward records two shot in December 1840, and one is said to have been obtained at Cullen in the spring of 1841. Smith records one, and marks it as occasional. There are none in the Banff Museum. It is included, but with only the remark, 'Moray Firth,' in the latest edition of *Fauna of Moray.*

Mareca penelope (*L.*). Wigeon.

Resident, and breeds commonly in the more northern parts of our area, and even as far south as Invergarry, as we are informed by Murdoch Matheson. At Tain and the Little Ferry it is very numerous, but mostly in the winter. They breed most numerously in the Sutherland portion of our area, more so than in any other place in the British Isles, with the exception of Loch Naver. They are very abundant in the Moray Firth below Kessock Ferry, but comparatively scarce above.

Edward speaks of it as 'one of our rarest Ducks.' A splendid male killed at Boyndie in September 1853. There are none in the Banff Museum (1892). Smith does not include it in his lists. Dr. J. O. Wilson says of it up the Deveron:—'Occasionally seen in winter.' St. John observed Wigeons on Loch Spynie in summer, but he considered that these were wounded birds, and were not breeding. Under date of August 25th, 1895, however, Captain Dunbar-Brander writes:—'I have seen one or two pairs remain here all the summer, and have seen a nest, but I never recollect seeing young ones; but I have not seen any remain for the last dozen years.' Hinxman records:—'In lochs of Abernethy in early spring; perhaps breeds.' Dr. Gordon, in his *Fauna of Moray*, also speaks of it as not very common, and as 'occasionally met with in winter on the rivers and lochs.' St. John says it was very common in winter as long ago as 1847, and in 1885 it is recorded as 'common and abundant' in Findhorn Bay, arriving in September and leaving in March. Hinxman found one pair on lochans at the head waters of the Blackwater—one of the principal tributaries of the Deveron—about 14th May 1891, and he and Eagle-Clarke saw many among the forest-lochs of Strathspey in May 1895, and considered that they must have been nesting there. In fine, we must now look upon the Wigeon as a rapidly increasing and extending species, where formerly it certainly appears to have been comparatively rare; but of its actual breeding areas south of Loch Ness there is still a good deal to learn, though it appears to be extending its range southward in that direction.

[*Obs.—Mareca americana* (Gmel.). American Wigeon.—A mutilated specimen—a male—shot in the burn of Boyndie in January 1841, was for many years in Edward's possession, but no trace of it can now be found, like so many of the rarer things obtained by him.]

Fuligula ferina (*L.*). Pochard.

By no means a common bird in the northern part of our area, and even in the Dornoch Firth they are only common in severe winters, according to that experienced wild-fowler, Mr. Jennings. One was killed at Invergarry in March 1853, and another at Invercarron in 1864. Mr. Muirhead shot one on Loch Ness near Temple Pier on February 18th, 1867, and seemed to have considered it a rare bird there at that time.

St. John considered it not an uncommon bird in winter, but only on one occasion did he observe it during the breeding season, when a pair hatched out their young in Lochlee.

We found the Pochard breeding, but in very small numbers, on Loch Spynie, both in 1891 and 1892. On the former occasion the nest was placed, like a water-hen's, in a small tuft of reeds close to the shore, which we could reach without wading; there were young just hatched, in the nest, and an addled egg. On the second occasion the nest was in a more normal position—

viz., in a large reed bed. It has also bred on Loch Flemington (*Millais*).

Of the Pochard we have, curiously, no positive record from the Deveron valley, but, as is well known, they exist in hundreds upon Loch Strathbeg ('Dee'), close to the confines of our area.

Farther to the westward it is considered common, mostly arriving in October and leaving in March, but some remaining to breed all summer—as, for instance, those mentioned above on Loch Spynie.

It is interesting to students of distribution and migration to find that the Pochard dispersal has extended to the west coast, as recorded under the species in our last volume (v. *Argyll*).

Nyroca ferruginea (*Gmel.*). White-eyed Duck.

In Small's 'List of Birds sent for Preservation' we find included, under Morayshire, a specimen procured previous to the 10th February 1857 (this being the date of its reaching his hands). Mr. Small informs us it was bought by the late Mr. Dassouville, out of Muirhead's—the poulterer's—shop in Queen Street, Edinburgh, as having come from the punt-shooters in the Moray Firth, and was noted in the Royal Physical Society's Transactions.

Fuligula cristata (*Leach*). Tufted Duck.

Not a particularly abundant species, even in winter, and not *as yet* found breeding in our area, though on one loch in the extreme north these birds are seen in considerable numbers all through the summer. Nor are they known to breed, as yet, in Loch Spynie, though we have seen them there.

One was shot at Lochletter, Glen Urquhart, in November 1878.

St. John remarks that this species is wholly a winter visitant, and not very common even then.

Edward pronounced the Tufted Duck as 'very rare,' nor did Smith include it, nor are there specimens in the Banff Museum. In severe weather it occurred in various localities, such as Loch Spynie, December 1860: again at same place in February 1880: and one in 1878, as recorded to us by Captain Dunbar-Brander. At the present day, the Tufted Duck is reported as 'not rare in winter,' by many of our informants, keepers and others.

The earlier records seem to emphasise the fact of the appearance of the Tufted Duck only in exceptionally severe winters, and even at the present day it is somewhat curious to find so little account of it anywhere in our Moray Basin. Thus it does not breed at Loch Spynie, though that sheet of water appears to be admirably suited for nesting purposes. Buckley has seen it in swarms upon Loch Aracline in Sutherland in July, but up to date of 1894 it had not bred there, though we know it to breed abundantly upon one of the Caithness lochs. Buckley has no record of its breeding from any part of the area north of Inverness, and neither has Harvie-Brown from any locality south of the Caledonian Glen within our boundaries of Moray; though Mr. J. G. Millais strongly suspects their doing so on the Loch of the Clans, near Kilravock, as he killed several young birds there, only recently able to fly, in 1891. Yet the Tufted Duck is one of our most plentiful species, breeding on certain favourable sheets of water in the Forth area, where it has become abundant only of late years, and again it is forcing its extension to some places in the west. A similar phenomenon is observable in the nesting distribution and lines of advance of the Stock Dove, at least as affected by the coast-lines of north-east Aberdeenshire.

The prominent inference appears to be, that the lines of the advance as a breeding species are based upon,—*first*, an *expansion*[1] of the autumn north-to-south original flight-lines, and, *second*, an *extension*[1] in our Islands along the return spring south-to-north line. Thus, from being only an autumn and winter visitor from (?) Northern Europe, owing to the said *expansion* it became, in time, a summer resident and breeder, *over the same lines*, after a few years' experience of localities *en route*.

Fuligula marila (*L.*). **Scaup.**

A common winter visitant to our estuaries, such as the Little Ferry, Dornoch Firth, etc., arriving in October and departing in March. In Macleay's ledgers there is an entry of one shot at Cluny, December 1862. St. John remarks that it is a winter visitor less common than formerly; he once killed one in good plumage near the Findhorn in July.

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[1] We use the terms *expansion* and *extension* advisedly. *Expansion* is a movement, *right* or *left*, or *outside* older channels. *Extension* is a movement *along* the old lines of travel.

Edward writes of it as 'pretty frequent in winter.' Others speak of it as 'not very abundant.' We have seen specimens in private hands shot off the mouth of the Deveron near Banff, and they are known to frequent the river itself in the long 'stank' below Alvah Bridge. Rev. Mr. Smith says:—'So far as I have remarked, does not penetrate beyond the influence of the tide'; but this is not invariably the case, as they are often obtained here, as elsewhere, far higher up. The Scaup occurred in summer on Loch Spynie in 1880, and was observed the previous summer (1879) at or near Lossiemouth.

Clangula glaucion (*L.*). Goldeneye.

A common winter visitant, and often remaining until late in the spring. Booth mentions seeing a pair as late as June 11th, in the year 1869. Mr. Jennings says that the old males are often seen together in flocks in the Dornoch Firth; in most places these old males are comparatively rare. Goldeneyes are found as often far inland as on the sea-coast, and the young birds are generally very tame.

One was seen about the end of May, or early in June 1894, near Invergarry; it was stated to have been a barren female.

Edward speaks of it as a regular winter visitant to his district:—'generally coast-wise,' but also on mill-dams and some miles inland. Dr. J. O. Wilson says it is occasionally seen in winter in the Huntly district.

In 1885 a pair was seen regularly at Loch Spynie during the ten days previous to 13th May, and then left. We are not aware that there are any suitable places for the species to nest there. Hinxman reports Goldeneyes as seen in autumn and early spring on the lochs far up under the Cairngorms—Loch Builg, Loch Garten, and river Avon. Foljambe also recorded it much earlier. Brown of Forres says:—'Common and abundant; arriving in October, departing in March; females more abundant than males.' Judging from our experiences of this handsome duck in Scandinavia, we would be inclined to credit its probable breeding among the far inland old pine woods or alder-lined rivers of Spey, near to the numerous wood-encircled lochs of that district, rather than nearer the coast at opener localities, such as Loch Spynie.

Harelda glacialis (*L.*). Long-tailed Duck.

Found in winter commonly all along the coast-line in suitable places. At the Little Ferry we have noticed these birds coming right up past the houses at the ferry, always restless and never long in one place. We have also occasionally seen a single young bird in the streams below the islands on the Ness.

St. John says they are common in the bay of Findhorn. On the sea-side they come close inshore, and dive even in the very breakers.

'Abundant,' says Edward, 'but always keeping near the coast.' Edward has shot them when in full summer plumage. Rev. James Smith calls them abundant in the bay at Banff, but he 'never observed them to enter the river, even for the most limited distance.' On the other hand, Mr. George Sim has seen this bird feeding on the river Ythan (Dee) at a considerable distance from the sea. In 1890, hundreds assembled off the Covesea coast, becoming scarcer, however, to the westward of the reefs, which stretch out near Hopeman.

Somateria mollissima (*L.*). Eider Duck.

Brown says they are occasionally common at Forres. Mr. J. G. Millais saw two Eider Ducks in Campbelton Bay, near Fort George, in 1891. St. John says it is a rare visitant, though sometimes seen in the Firth.

There is one female in the Banff Museum, but it is not included in the earlier lists at all. At present it is commoner in the Moray Firth than formerly, though at the date of the *Fauna of Moray* it was recorded as only occasional there. It is sometimes met with inside Findhorn bay.'

Œdemia nigra (*L.*). Common Scoter

The Scoter does not seem to be a particularly abundant species on our northern coast-line. Mr. Jennings writes of it:—'Common, but not numerous at the entrance of the Moray Firth.' One was sent in to Macleay from the Beauly Firth in February 1861.

Regarding the breeding of the Scoter in Moray, 'Roualeyn Gordon Cumming told Captain Elwes that he had on two or three occasions shot the bird off its nest in Inverness-shire, and the latter gentleman saw a young bird, half grown, which was killed in the upper part of Strathglass early in September' (Dresser, *B. of Europe*, vol. vi. p. 664). On May 3rd, 1867, three of these birds, two drakes and a duck, were shot by Andrew M'Intosh at Loch Righ Dhu, in the Balmacaan Forest, and given by him to Mr. Muirhead, who still has the duck in his collection (*in lit.* 5/x/95).

In answer to our further inquiries, Mr. James Cameron, head keeper at Balmacaan, wrote us on September 4th, 1895, that some Scoters or Black Ducks had been killed at the loch just referred to by Mr. Bradley-Martin, junr., on August 14th of that year.

St. John says they frequent the shores of the Moray Firth in considerable numbers. After a severe storm from the north specimens of the common Scoter are occasionally found along shore, as recorded in some of the earliest lists.

Of its occurrence inland we have little to record—*i.e.* south of the Caledonian Canal. Mr. R. H. Read relates that he saw 'a black duck get up from the river Spey between Lynwilg and Aviemore,' which he 'thought belonged to this species.' We notice this if only to accentuate the rarity of the Scoter at inland localities in the south of our area, so far as has yet been observed.

Œdemia fusca (*L.*). Velvet Scoter.

At one time Velvet Scoters used to be not uncommon at one or two places on the northern part of our coast-line, but we have not seen any for more than twenty years there; probably the bank on which they fed got covered up. They are common at the entrance of the Little Ferry, but on the Dornoch Firth Mr. Jennings has only met with a single example—a male—which he killed 'about 1881.'

Dresser remarks (*B. of Europe*, vol. vi. p. 658-59) that Roualeyn Gordon Cumming showed Captain Elwes Velvet Scoters' eggs which he had taken in Scotland. Booth also told Dresser that, though he had never himself seen this species nesting, he had sent a man, who knew the birds as well as he did, to search a loch, and he found the eggs, but as he, Booth, did not want them they were not taken. In answer to a letter on this subject, Mr. Dresser wrote us that in accordance with Booth's request he had destroyed his notes in which the locality was given, and he does not now remember where it was.

St. John says they are common in the Moray Firth, generally in small companies.

A flock of ninety-five lived all the winter of 1889-90 just outside a small skerry close to Burghead, and were very constantly observed by Brown of Forres. This fine flock kept steadily to the same area of water the whole time.

Mr. George Sim informs us he has also received specimens at various times from the coasts of the Moray Firth.

Mergus merganser, *L.* **Goosander.**

Local Name.—Saw-neb.

We have notes of the occurrence of the Goosander from all parts of our area,[1] and it seems more than probable that, from the dates given, it breeds quite commonly—certainly more so than formerly, or was generally supposed.

Possibly in the north central district this bird has been unnoticed for many years past, being confounded with the Merganser; anyway it is a very common breeding species there now.

Mr. Muirhead, in his notes, says that one of the Balmacaan keepers had seen several Goosanders near the old castle of Glen Urquhart of late (March 1867).[2]

In looking over an old ledger of Macleay's, we find entries of the Goosander from many localities in Moray, as far north as Loch Luichart. The dates attached to some of these entries are significant: Corriemony, June 1863; Aviemore, May 1878; Cawdor, May 1864, etc. These dates show that the bird occurred in the breeding season some years previous to the actual discovery of the first nest, as related further on. According to the same authority the bird had occurred at Glen Affric; and by 1880, Mr. Sargeant had seen them often at Struy, on the Beauly river, and considered that they were probably breeding.

Of late years old birds have been seen as far north as Sutherland, where they are said to have bred on Loch Shin, in 1875 (*F. S. C.*, p. 196), and we have seen them on the Cassley River; on the Dornoch Firth they are only occasionally seen in pairs in winter.[3]

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[1] *Fauna of Sutherland and Caithness*, pp. 195-6.

[2] Goosanders always remain till late in March, and even into April, at many places.

[3] Mr. Baillie informs us he saw a pair of Goosanders on the sands at East Brora, May 12th, 1892.

At the present time the Goosander breeds commonly in places lying north of and running up from the Great Glen, though, like the Red-breasted Merganser farther north, it is systematically destroyed. Hollow trees not being available, they make their nests in hollows at or under the roots of the trees. St. John says that the Goosander is a common bird, and breeds in the north of Scotland; he however gives no mention of actually finding a nest. Donald Gillies, before referred to, says he remembers the Goosander quite well as a winter visitant to Invergarry, but that it certainly did not breed there when he was a young man—*i.e.* about forty to fifty years ago (1830 to 1840).

Later information goes to prove that these birds are kept down in some places from incessant persecution during the winter and breeding season, and our request for a nest in one district was met by the answer that none were to be got, though, later, one brood was seen.

South of the Ness Edward reckoned it as a winter visitant. As many as seven or eight had been procured at one shot on the Deveron. There is a specimen in the Banff Museum.

The species is very abundant in winter, remaining some seasons late—or, otherwise, remaining later and later—in spring. The latest instances noticed during three years by Harvie-Brown upon the Lower Deveron occurred in April 1891, and this was remarked also by keepers and others. Harvie-Brown saw a dozen on April 15th; three or four every day after till 24th April, but after that, none.—Harvie-Brown was there until the end of May.—We know of their increase and breeding of late years in the east of Moray, on Findhorn. Goosanders, however, are rarer on Deveron above Rothiemay, and they seem to confine themselves greatly to the lowest reaches of Lower Deveron. If they are spreading eastwards, then they appear to be following the lower grounds and larger reaches of the rivers near the coast. Dr. J. O. Wilson, writing in 1888, says:—'it is occasionally seen in winter around Huntly.'

Although it is not perhaps advisable to go into details regarding a species as breeding or distributed in localities beyond the limits of our area under discussion, still, as a side-light, we think it only right and interesting to refer to the earliest recorded nest which was found close to our boundaries, viz., the eggs obtained by ourselves from Loch Errochd in 1871, full particulars of which will be found under the species in Dresser's *Birds of Europe*, and to which we have already referred in a previous volume (*Argyll*, p. 141), where the side-light is probably equally strong. We do not mean to say it did not breed earlier there or elsewhere, as we have already just indicated that this may have been the case.

That the Goosander has continued to breed regularly upon Loch Errochd-side is almost beyond a doubt, and Harvie-Brown saw more pairs than one there in 1880, and young were hatched out, but not at the old place. In 1881, they were stated *not* to have bred upon Loch Errochd for two years, but in reality they had only shifted ground, leaving the old, much-disturbed place and going farther down the loch-side. In 1885 a pair was seen flying down the river Spey at Aberlour on April 28th, and they were known to Brown of Forres to frequent the Findhorn at that time also. In 1885 also we saw a brood upon Loch Errochd near Ben Alder, and a male flew past us while fishing near Corrievachtie on that loch.

As early as 1866 four were killed at Westerton, Pluscarden, in October (*Fauna of Moray*); one male at Calcots in Jan. 1875 by Mr. Rowlandson MacDonall; one male on the Spey in February 1880 (*Fauna of Moray*). It had occurred in Glen Affric (Macleay's ledgers) and at Roy Bridge (Argyll), at Gaick (Macleay), and at Tomatin, Findhorn, in 1882. Of its occurrence in winter Brown of Forres says it is 'common, but not very abundant, in winter, on the Findhorn, *ascending* the river, and most of them departing at the end of spring.'

In 1892 Goosanders bred about Loch Morlich—*fide* keepers; but Harvie-Brown saw none there. In Darnaway Castle is a stuffed bird, shot on the Findhorn, where Mr. Brown (factor on the estate) assured us they are now known to breed. Hinxman saw them on the Spey at or near Advie, April 12th, 1892, but not breeding (? J. A. H.-B.).

Hinxman considers that it is only within the last two years that any great increase has become evident. He found a young bird high up on the Allt Beine Mhör, near the entrance to Glen Eunach, on May 21st, 1894. The first extension appears to have been from west to east, and north to south over the watersheds, a returning upon the autumn migration and winter occupation in the east.

From the above and many more detailed statistics, I think we can fairly well establish certain lines of advance of this rapidly extending species.

Colonel Duthie observed a nesting-hole of the Goosander in 1892. It is in a large dead pine, and the hole is 12 feet from the ground, and was full of down and egg-shells, which that gentleman took. This was pretty far up the river Nethy, above Forest Lodge. We would have liked to illustrate this, but unfortunately the camera was wanting (*in lit.* 9th May 1893).

In 1894 Colonel Duthie 'again found the same place occupied, but some beast had destroyed the eggs,' and he adds, 'there was another nest in the vicinity.'[1]

Again in 1895 Colonel Duthie found Goosanders in the same district, and Hinxman says he observed them nesting there in increasing numbers. The keepers wage war against them for alleged destruction of trout. One keeper in Rothiemurchus destroyed three broods. This season O. A. J. Lee obtained photographs of nesting sites.

Mergus serrator, *L.* Red-breasted Merganser.

Local Names.—Saw-bill and Saw-neb.

This species seems to us to be more abundant in the northern parts of our area than elsewhere, though its numbers are kept down by incessant persecution in the inland localities. Mr. Jennings remarks that many breed in the whin-bushes along the shores of the Dornoch Firth; possibly they are less subject to the scant mercies of the keepers' guns in this situation. St. John remarks that they are commoner than the Goosander.

The *O.S.A.* is silent as regards this species south of the Ness. Edward says:—'Not very plentiful, but all along the coast of Banff, singly or two or three together—rarely more.' Called 'rare' also in Smith's lists, and there are no specimens in the Banff Museum. Not observed by us on Deveron up to 1891, nor included in Dr. J. O. Wilson's list at Huntly. In 1887 we find our own note written down:—'Only a few years ago this species was scarcely known, and then only as a comparatively rare winter visitant along the south coast of the Moray Firth. Now it literally swarms all along the banks of the Findhorn, nesting in thick gorse coverts close to the river-side. To-day—8th July 1887—we saw an immense flight, at least two hundred birds, flying with arrowy speed in a long, drawn-out line, just outside the salmon-nets off the Culbins—a sight only comparatively common of late years.

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[1] Since the above was penned, Colonel Duthie has sent us a rough sketch of the tree, taken in 1894 upon the occasion of his second visit.

Brown of Forres adds the following:—'Four years ago (or about 1887 or 1886) the first nest was found in gorse, not a stone-throw from the iron suspension bridge over the Findhorn. Now there would be no difficulty in finding half a dozen nests before breakfast.'

On the river Avon a few have been seen by Hinxman in autumn.

All old records agree in the matter of its former rarity, and Dr. Gordon considered it rare when he wrote his *Fauna.* In 1892, scarcely a doubt remains that they bred for the first time, to the knowledge of Mr. William Brown—long keeper on Rothiemay estates,—on the banks of the river Deveron, below Rothiemay village (*auct.* Charles H. Alston and Mr. Brown, keeper), and in 1893 Mr. William Brown again observed the old birds, but not the young. Mr. Charles Alston also records a female and brood appearing on Lochan Ovie in Upper Badenoch in July, and five mature birds in August 1890.

By 1894 Red-breasted Mergansers, for the first time known, bred on the east bank of the Lower Findhorn on Mr. M'Kessack's ground, where a nest with ten eggs was found by one of his sons, one of which Mr. M'Kessack kindly gave Harvie-Brown for his collection. The tendency of the lines of extension certainly in the case of this species appears to be from west to east, arising, with little doubt, from congestion and rapid increase in our western faunal areas, where, even in the barren Outer Hebrides, they have long been known to nest abundantly. On the other hand, the lines of the extension of the allied species, the Goosander, are not so distinctly traceable if we start from the earlier records at Loch Errochd and Loch Awe, and then take into consideration the later discoveries northward through the Western Highlands—leaving out the Outer Hebrides,—and again eastward down the Spey valley, through the suitable haunts afforded by the great loch-besprinkled pine forests and old alder and birch-clad banks of the river itself.

One was obtained at Aviemore in May 1878 (Macleay's ledgers), and a pair was found nesting on an island in the Spey at Cromdale, thirty miles from the sea, in June 1895, by Lionel Hinxman.

Mergus albellus, *L.* **Smew.**

A very rare winter visitant to any part of our area. St. John mentions it, and adds that it is very rare, especially the old males. One was shot in the Beauly Firth in March 1858, and was stuffed by Macleay.

An adult male was shot on the river Nairn by the father of the present proprietor of Holme Rose. We saw it in the house at Holme Rose in 1892. Another was shot on the Moray Firth a year or two ago (*auct.* Major Chadwick in list 1885).

A male and female are recorded by Dr. J. A. Smith as having been killed near Mount Blairey on the Deveron in February and March 1853 (*Proc. Royal Phys. Soc. Edin.*, vol. i. p. 18).

[**Mergus cucullatus**, *L.* **Hooded Merganser.**

Hypothetical occurrence recorded by Edward.]

Order **COLUMBÆ.**

Family **COLUMBIDÆ.**

Columba palumbus, *L.* **Ring Dove.**

Local Name.—Cushie or Cushie Doo.

A common species, and in many places abundant. In the summer the Wood-pigeons spread all over the country, going up into every strath and glen to breed, returning to the lower cultivated grounds in the winter, and collecting in places in large flocks, as at Beauly.

Writing in 1847, Hepburn remarked that this species was very common in the wilds of Inverness-shire, but was at that date a comparatively recent colonist. Mr. A. Craig mentions that the severe winter of 1880-81 reduced their numbers considerably in the neighbourhood of Glen Urquhart.

Wood-pigeons vary in numbers, at least in some districts. Thus they were extremely abundant in the autumn of 1891 in the east of Sutherland, whereas in 1892 we saw very few indeed. They are at times seen on migration, as Mr. Houstoun, Kintradwell, informs us; on one occasion he saw a flock coming towards the land over the sea from the east.

Varieties of the Wood-pigeon are rare considering the abundance of the species. We have seen a mottled one in Macleay's shop, and St. John mentions a pure white one, which was seen for three winters near Elgin. He also notices the disease which attacks these birds, warty excrescences on their feet and bills.

South of the Great Glen the Ring Dove has been familiarly known as far back as our records carry us. At the time of the *O.S.A.* it was mentioned as destructive in the parish of Kirkhill, and as occurring in Kirkmichael, Glen Avon. Edward speaks of it as 'amazingly increased of late years,' and as 'a pest to farmers'; and other older records give it prominence. Dr. J. O. Wilson pronounces it 'too abundant around Huntly from the "distressed agriculturalist's" point of view.' Gray, quoting the *Zoologist*, October 1879, page 428, says:—'In October in three years it was recorded that no less than 20,529 Wood-pigeons were killed in Banffshire.' It is very common from Upper Cabrach downwards, but least so, naturally, in the higher Carn districts, becoming more abundant in the birch-clad valley slopes. At times, however, it is abundant, far from woods and crops in parts where hill-berries and fruits grow and ripen. They are to be seen flying up singly or in scattered companies all through the pine-woods of Spey, but not in large flocks as in the open or among the cropped lands. They are extremely numerous around Rothiemay, and many can be obtained by posting guns in different woods and keeping the flights on the move—a beautiful form of sport. On the other hand, we learn from Mr. Phillips, that only a few years ago, the wood-pigeons which visited Glen Livet could be counted (*in lit.* 1885). Certainly we ourselves saw very few there in June 1892, though we did see some flying very high overhead. A few pairs of Ring Doves nest far up among the loose screes or ravines with stunted *birch*-trees for a blind, but disappear when the young are hatched. The Wood-pigeon is everywhere abundant throughout the Braes of Moray, and the Laigh, abundant on the Upper Findhorn far above Tomatin, and in all the Speyside forests. By 1892 (or 1891) Hinxman speaks of a decided increase in Glen Avon and Glen Livet (see Phillips' note, *antea*), and it is generally spoken of as still increasing.

Now, in the beginning of this century, as Captain Dunbar-Brander was assured by his father (Sir A. Dunbar), Wood-pigeons were so rare, that if one was heard calling by anybody, they would report it when they came in, thus:—'I heard the Wood-pigeon' (Captain Dunbar-Brander, *in lit.* 1st September 1891). Absence of observers therefore cannot be pleaded as a cause for absence of records, which can so often be done with less conspicuous species.

In 1893 we found Ring Doves extremely abundant on the Lower Deveron about Laithers, Drachlaw, and Netherdale, and also equally so along all the lower reaches of Spey. On the former river nests were abundant in May, and an extraordinary site for one of these was chosen; it was built of the usual beech and birch twigs, quite a considerable platform, and was laid upon level sawn planks which were placed upon the rafters, under the roof of the saw-mill at Drachlaw farm, and contained two eggs. The saw-mill is in pretty constant use, and was at work upon the 7th May. We first saw the nest on the 9th. A Pied Wagtail's nest and the old nest of a Grey Wagtail were also in chinks of the masonry and within a few feet of the saw. The Wood-pigeon deserted, and did not take off its young, although the Grey Wagtail did.

The following note is interesting as dating 1860, showing even at that time the enormous increase and vast numbers of the Ring Dove which visited Banffshire. In the same winter we can remember all around Edinburgh and the Lothians the immense flocks that appeared during that exceptionally severe season. It appears to be from this date onward that its rapid increase as a nesting species in Scotland became evident.

Edward says, writing in 1860:—'The "Cushie-doo" bids fair to become one of the greatest pests the farmer will have to encounter with respect to his crops. These birds have increased amazingly within the last few years, and the damage they do is incalculable.' Again:—'In August 1879, at the Central Banffshire Farmers' Club, Viscount Reidhaven, after mentioning that a suggestion had been made to form an Association for the Destruction of Wood-pigeons, read some statistics showing what had been done on his father's estate from 1876 and 1879. In these four years 15,194 eggs, 1603 young birds, and 3733 old birds were destroyed, making a total of 20,529. The head tax was £117, 13s. 3d.'[1]

A pure white Ring Dove was shot on 11th February 1895 upon the estate of Dalvey, the property of Major Macleod, and is now in Dalvey House (Brown of Forres, *in lit.* 14/v/95).[2]

Columba œnas, *L.* Stock Dove.

In the north of our area the Stock Dove was not known in Sutherlandshire until the autumn of 1887, when on September 22nd Buckley shot one among a number of Wood-pigeons at Kintradwell, near Brora. In 1889 the first nest was taken there, and since then the bird has increased greatly, so much so that it is quite a common species. We saw quite a large flock near the Little Ferry in August 1892.

In 1887 we saw a Stock Dove fly out of a tree in the Balnagown wood, evidently nesting; but the birds in most parts of our area nest in rabbit-burrows or rocks, the larger wooded areas being in most cases of too recent growth; besides, there is an insufficiency of hardwoods, which alone give the holes these birds prefer for nesting. About Beauly they nest in rabbit-burrows, but are not very common. Booth in his *Rough Notes* (1881-87) says:—'In the beautifully wooded glen through which the Beauly runs, near Eilean Aigas, and again in the valley of the Druim, I recognised several pairs.'

In May 1892 we heard Stock Doves cooing at Guisachan. This appears like an extension of range up the Beauly river.

In a paper read before the Royal Phys. Soc., Edinburgh, on the 21st February 1883, Harvie-Brown treated at some length of the extension of range of the Stock Dove throughout Scotland; and took occasion to speak of the natural laws which regulate these waves—so to speak—of distribution of this and many other species (*loc. cit.* p. 242).

It is interesting to find that while the Stock Dove rapidly spread northwards along our east coast after its first appearance in Scotland, simultaneously a decrease of their numbers became apparent at the centres of their former distribution, as we believe we may look upon the south-eastern counties of England as the cradle of the race, so far as Great Britain is concerned.

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[1] *Ornithology and Agriculture*, edited by John Watson, 1893, 8vo, p. 95.

[2] On October 27, 1894, a young pure white Ring Dove was found in a disabled condition, by a shooting party, in a thick cover, in Stirlingshire, of which party Harvie-Brown was one.

We think it desirable in this place to shortly summarise its history as a breeding species in Scotland. Passing over the steps of advance of the species through the English counties, which will be found partially detailed in the paper above referred to, we come to the southern districts of Scotland.

The first records of the Stock Dove in Scotland are of quite recent date. Gray, whilst doubting an early Caithness record (*Proc. Royal Phys. Soc., Edinburgh*, vol. ii. p. 334, *q.v.*), accepts a later one by Mr. W. Reid of Wick, when a specimen was obtained at Deerness, Orkney, on 12th October 1861. Mr. J. J. Dalgleish then follows the record with two more from the district of Culross and Tulliallan ('Forth area') in 1878, and Mr. A. B. Brooks 'first observed the Stock Dove about 1875 or 1874' (v. *Ibis* 1879, p. 112), and again at the same place in 1879—viz., the upper Tay valley.

Further extensions then took place, the species penetrating up the larger river-valleys, to Gartmore (Forth, Harvie-Brown), Carse of Gowrie (Tay, Colonel Drummond Hay), increasing rapidly as a spring migrant and settler in the middle of April 1881, but rarer in 1882; and so from that time forward it may be said to have annually increased in Berwickshire and Dumfriesshire, and in the south-west of Scotland, and reached far up the eastern side of Scotland.

So far then did we treat of the subject at the date of Harvie-Brown's paper in 1883. We now take up the tale during the subsequent years to 1892, when it will be seen with what marvellous rapidity the Stock Dove has populated the Laigh of Moray.

Of our western or south-western areas we need not say much, except that they have, after coming from Cumberland and populating the area north of the Solway, greatly increased in numbers, as we are assured by Mr. J. J. Armistead of the Solway Fisheries.[1]

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[1] Be it understood that in thus reviewing the *advance* it is—if an extensive side-light—still one which can hardly be dispensed with, if we regard our direct subjects of Distribution and Extension, and Migration of Species.

The Stock Dove has undoubtedly largely increased in numbers and extension of range up the Forth valley as far as, and farther than, Loch Ard. It is found also on the Fife coast north of the Eden, whence we have obtained eggs by the kindness of a friend—Mr. W. Berry of Tayfield—where, however, they have only appeared within the last two or three years, say 1890.[1] On the other hand, it appears to be either absent or but little known in the interior of Fife, or otherwise, only a few stray specimens are reported as far inland as Blairadam, near Kinross: we hold returns mostly quite negative from several competent observers in the interior. It has no appearance of increasing in the west of Fife since the earlier records given by Mr. J. J. Dalgleish.

On the Tay above Perth they appeared first about 1889 at Blackpark, according to Mr. Adam Steel, Fairmount, Perth—they 'came from a southerly direction, and when disturbed always flew back same route.' Blackpark is about nine miles north-north-west of Perth. It is said to breed on the banks of the Almond, on Lyndoch estate. It is reported as decidedly increasing around the upper Tay slopes, as at Cardney, near Dunkeld (this is ten years since Mr. Basil Brookes' first record), and they nest numerously on rocky precipices and on the open moor.

In the county of Aberdeen, as we are informed by Mr. George Sim, Stock Doves first appeared upon the Links of St. Fergus, to the north of Peterhead, where they have nested regularly for the past seven or eight years. Mr. Sim visited their breeding-ground in June 1881, and saw four or five pairs. It is estimated that there are between twenty-five and thirty pairs there. Their next appearance was upon the 'Back Bar,' between the Loch of Strathbeg and the sea, where they have bred for several years; their exact number is not known. Lastly, they appeared on Mennie Links, about eight miles north of Aberdeen, in 1888—about twenty-five pairs.

It is perhaps worthy of note in this place to remark that they appear to have spread southward from their first residence, or at least populated areas south of their first-known haunt among the

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[1] Except that Mr. James Duffus, professional pigeon-shooter, remembers sending one for identification to the British Museum about eight or nine years previous to 1892 (W. Berry, *in lit.*).

St. Fergus Links. And it is also worthy of remark, possibly, that neither Sim nor ourselves have succeeded in obtaining a single positive record from either Forfar or Kincardine south of the river Dee.

Within the Moray Basin at the present time—1892—Stock Doves literally swarm all along the sandhills, rabbit-wastes, heathery and gorse-covered portions of the Plain of Moray, over the Culbin Sands, penetrating up the Findhorn and Nairn, and populating the hardwoods around these rivers in their lower straths, dispersing apparently westward along the plain, and radiating afterwards up the side valleys, being found also far up the Avon, though not as yet in large numbers, and among the hills and scaurs of the Carn districts. When searching for Sand Grouse on Mr. Mackessack's ground east of the Findhorn, many were disturbed by us among the gorse-covered rabbit-grounds; others were seen east of Loch Spynie flying past or coming to drink at the marshy pools between Loch Spynie and Lossiemouth. Their extension has been so rapid, and their increase in numbers so unprecedented—almost sudden—in Moray, as almost to defy detail in an exhaustive sense, and indeed it seems almost unnecessary to attempt to arrange such numerous statistics. Ultimately, if the Stock Dove continues to increase and spread as it is now doing, it may rapidly become a daily feature in the Moray landscape, just as Wood-pigeons are now.

We have spoken thus of the amazing increase in late years within Moray. Now in St. John's time, that able and thoroughly observant naturalist passes over its name in silence, and so also do all other writers whom we have before quoted, until we reach the date of about 1883. In that year Captain Dunbar-Brander first informed us of their breeding among sandy hillocks near Pitgaveny. By 1885, Jock Phin—Captain Dunbar-Brander's gamekeeper,—who was the first man to discover them, informed us that some four or five pairs then occupied the above-noted sites.

In 1887 Harvie-Brown, as already stated, saw a number on Mr. Mackessack's ground flying out of the rabbit burrows, but Mr. Mackessack said that they were not now so numerous there as about five years previously. We look upon such observations as interesting from a resident gentleman like Mr. Mackessack, as indicating a pressure of a distributional wave moving westward, for about this time—1887—great increase was noticeable to the west of Findhorn and among the Culbin Sands, and up the rugged valley of the river Findhorn.

Mr. Mackessack places his first observation of the Stock Doves at the date of 1879 or thereabouts. Up to the date of 1887 the species was reported at all hands as 'less common west of the Findhorn or among the Culbins,' although one or two nests were known to Brown of Forres. Others of our correspondents and friends around Forres and Elgin relate how the bird came from the eastward, and has now spread over all the likely ground which fringes the south shore of the Firth, between Covesea and Burghead, Findhorn and Nairn.

In this year—1887—O. A. J. Lee took eggs of the Stock Dove from a rabbit-hole among the sandhills of Culbin, close down to the sea-shore and opposite the village of Findhorn. The eggs, now in our collection, were laid about four feet from the entrance.

No Stock Doves were sent in to Macleay for preservation until quite recently, when, along with one or two specimens sent by ourselves from Sutherland, others were sent in from near Nairn by Mr. Hugh F. Rose. At a house near Cawdor we saw, in a small aviary, some Wood Pigeons and Stock Doves, which latter the owner called Rock Doves, and on inquiry we found that they had been taken out of some rocks up the Cawdor burn, where they were by no means uncommon. Both they and the Wood Pigeons were quite tame.

Of its inland distribution we are told by Hinxman of his finding two nests in holes amongst rocks and heather on the tops of Carndregnie and Carn Dubh in Glen Livet. He saw the birds close at hand and identified them, and, what is interesting, if correct, Mr. Petrie, the gamekeeper, repeatedly assured us personally, when staying at Glen Livet, that these pairs of birds had bred regularly since 1885, which was the date of Mr. Petrie's taking up his situation there.

Again, in Strathspey, William Evans had a good view of a Stock Dove flying up the valley of the Spey, near Kincraig, on August 20th, 1889, so we may probably look for still greater expansion along the great highways of migration, overflowing in time into the lateral valleys.

Mr. Hugh F. Rose, of Holme Rose, near Nairn, came across a nest of Stock Doves with two young ones, which he took. Mr. Rose wrote us, under date of June 1st, 1892:—'The Stock Dove is quite a recent visitor to these parts. There were none here three or four years ago. There is another nest on my property in a rock on the moor, but in a very inaccessible place.'

Stock Doves appeared to be steadily, even rapidly, on the increase in 1893. We observed several pairs at Netherdale, on the Deveron, in May. But around Fochabers we failed to identify any as late as August 1st, or on any of the very lowest reaches of Speyside. But Hinxman found them breeding—9th to 15th April—at Allt a' Gheallaidh, a burn which joins the Spey just above Blacksboat. There seems to be good reason to believe that the Stock Dove has frequented these parts for some years, and has not always been distinguished from the Wood Pigeon. There can, however, be no doubt regarding its patent increase of late years, in by far the greater part of our present area; and that it is spreading, both inland from its earliest shore haunts, westward up the Spey, and also eastward towards the boundary-line between Deveron and the area of 'Dee,' seems certain, if our further notes in the spring of 1895 be considered, and which we now give:—Now, we have said we saw several pairs at Netherdale on the Deveron in May 1893; but not until 1895 did we discover a nest. One pair of birds was repeatedly observed in the end of April and early in May in the latter year, frequenting a steep slope or green hanging 'brae' at the 'Upper Heron' Pool, upon Laithers property, on the Lower Deveron, and at last one bird was watched to its nest by Harvie-Brown on the 9th May, and with the assistance of a short ladder the two eggs were obtained. The hole in which they were placed was not less than 14 inches down in a crevice of the slaty rock, and in a side-tunnel which penetrated at a right angle under luxuriant tufts of *Luzula sylvatica*. The nest was simply a dry bed covered with dead brown leaves, which may have been placed there by the birds, or, what seemed as probable, had been drifted in by the eddying wind, and lodged there. The eggs are now in our collection at Dunipace.

Now, as we are assured both by Mr. George Muirhead and Mr. Sim, no Stock Doves have as yet appeared among the braes of

Gight on the Ythan, nor have they penetrated far inland from the sandhills of St. Fergus, or other east-coast haunts in 'Dee,' and at present the population of these birds is at least ten times more extensive at 'Moray' localities than in 'Dee' (*i.e.* in 1895).

Columba livia, *Bonnat.* Rock Dove.

Local Name.—Doo.

Besides the Ord of Caithness, the Rock Dove occurs in the caves on the Sutors of Cromarty. Brown says it is common at Forres, frequenting the rocks on the Findhorn. This, however, probably refers to the Stock Dove, as this latter bird is called Rock Dove about Cawdor (*vide* Stock Dove).

Edward says a few pairs breed in the caverns of the cliffs. [One named Rock Dove, which we saw in the Banff Museum in 1891, is a tame Dovecot Pigeon. Perhaps it is *still* so named.] Smith only reported it at Gamrie, the rest of the coast—*i.e.* westwards from Gamrie—not being suitable. The statement that Rock Doves breed among the Correen Hills is in all probability an error. Mr. Sim went there on purpose to ascertain, and found only the Common Cushat. The Correen Hills are really within the area of Dee. We notice this side-light here, however, because, as will be seen under our last species, the Stock Dove assuredly breeds high up in the Carn district, as Hinxman has made certain of. Of course we know they also breed in similar locations far up the valley of the Forth, and there may be still a possibility that a pair or two misnamed 'Rock Doves' may occupy similar sites in the Correen range. We may safely, however, leave this to be decided by Mr. Sim. We certainly do know of real 'Blue Rocks' nesting in ravines, inland in West Ross, but these ravines communicate directly with the sea, and we are not aware of *any* localities where Rock Doves nestle at far inland sites on the east coast of the northern and eastern districts of Scotland.

Turtur communis, *Selby.* Turtle Dove.

This species is not a common visitant to the north of our present area. On September 21st, 1891, Mr. Houstoun writes us that he, on the

Saturday previous—the 19th—'shot one which we had observed for three days before then, flying about with a flock of Lapwings on the sea-beach.' We saw the bird in Macleay's, where it had been set up for the Dunrobin Museum.

Others appear in Macleay's ledgers as having been shot at Kingillie, near Beauly, in 1853, and at Fort Augustus in July 1884. In the *Field* of January 16th, 1886, there is a note of one shot near Elgin on November 6th, 1885, and the writer—Mr. A. Dunbar—says this is the third specimen in that country during the last six years. Another was in company with the one shot.

O. A. J. Lee in a letter to us says that Mr. Stirling of Garden saw a Turtle Dove in a wood of alders near the Findhorn on the 17th September 1887.

St. John mentions seeing a pair daily for a short time, probably near Forres, and we have a note of one killed about there in 1844. Another was killed at Waulkmill, near Elgin, in October 1858.

Mr. John Gatherer, of the Elgin Museum, having sent us notice of a veritable Turtle Dove (*T. communis*, Selby), we pressed for a further identification, and Mr. Gatherer, having again inspected the bird, assured us of its identity. It is an adult male, and agrees in every particular with those given in the latest edition of Yarrell.

Edward says:—Three or four specimens are recorded as obtained, but one *so labelled* in the Museum is an Egyptian Turtle Dove, or escaped bird, like so large a proportion of Scottish records of Turtle Doves.

Order **PTEROCLETES.**

Family **PTEROCLIDÆ.**

Syrrhaptes paradoxus (*Pall.*). Pallas' Sand Grouse.

The first invasion of this far-eastern species in 1863 has been duly chronicled in the pages of the *Ibis* (1864, p. 185 *et seq.*) by Professor Newton. By that account three birds were procured and a flock seen at Brora in our present area. One was shot by the Duke of Richmond at Gordon Castle on October 16; a male, struck down by a hawk at Lossiemouth, no date given; the third was shot at

Dornoch on the 5th or 6th of June. The flock of birds observed at Brora, and supposed to have been the Sand Grouse, were seen on June 1st. Of the second irruption, of far greater magnitude than the first, we have an epitome prepared from Professor Newton's and Harvie-Brown's notes, supplemented by many other local lists and records—by Rev. H. A. Macpherson, in a pamphlet entitled *The Visitation of Pallas' Sand Grouse to Scotland in* 1888 (London: Porter, 1889), and we quote here that portion which relates to the Moray Firth area (*op. cit.* p. 5 *):—

'The known occurrence of a single Sand Grouse near Elgin in 1863 little prepared ornithologists to expect the incursion of hundreds twenty-five years later. . . . On May 15th, 1888, a party of three Sand Grouse appeared at the mouth of the river Findhorn. . . . Two were seen there the following day; a dozen were identified near Elgin on May 17th; and four or five were seen at Nairn on May 18th. Mr. Mackessack—of Newton Struthers, near Forres,—who did so much towards their careful preservation for months afterwards, when they became more abundant—saw twelve on May 24th, and fourteen between Forres and Burghead on the 25th, on which day a fine male was killed a little inland at Rafford.[1] Many others followed. At Fort George it occurred on June 7th, and 'several were reported from the Black Isle.' Other localities are Strath Carron, Bonar Bridge—where three were shot on May 30th, 1888, the first received that year by Macleay,—Cromarty and Grantown. None were sent to Macleay after June 10th. And this does not by any means exhaust the accounts. Indeed, as Mr. Macpherson remarks, 'the two immigrations of 1888 and 1863 agree very closely in the *lines* taken,' and:—'In other words, wherever a Sand Grouse occurred in 1863, there a score or half-a-hundred appeared twenty-five years later. The earlier immigration spent its force on the east coast of Scotland, to the south of Aberdeen. The later influx of Sand Grouse affected the Moray Firth, Caithness, the Orkneys and Shetlands and the Hebrides, far more than eastern Scotland south of Aberdeen. Nevertheless, we find that almost all the old spots were revisited: exceptions to this are very rare'[1] (*loc. cit.*, *vide* Introduction, p. viii). We have since heard of others penetrating inland to near Kincraig, on the Spey, and being found on Ben Rinnes, showing how even this sand-loving bird may flight along the great open pathways of migration, and we know that within a few days of their appearance in Aberdeen and Moray (14th and 15th May), the first farthest stragglers were found as far west as the island of Tiree (28th). The Outer Hebrides, however, and Tiree are more likely to have been peopled *viâ* Orkney and Shetland and the Pentland Firth, though there is no reason to doubt that the great trough of the Caledonian Canal and the valley of the Spey may have contributed their quota to these far-western localities.

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* We must insert here two occurrences not mentioned by Mr. Macpherson in our area. First, a flock seen between Dornoch and the Meikle Ferry in June and as late as July 4th. Secondly, a pair were seen in the Golspie Links on July 14th (*Annals of Scottish Natural History*, 1892, p. 165). Sheriff Mackenzie also reported to Harvie-Brown that he saw 'scores' at Tain.

[1] We are glad to say that the offer of £1 for each bird offered to Forres bird-stuffers did not induce them to tempt the keepers. All praise is due to them—Mr. Brown and Mr. Ledingham.

Suffice it further to say here, there were hundreds of birds—if not indeed thousands—along the shores of the Moray Firth; and they were particularly abundant east and west of Findhorn Bay, and again east of Loch Spynie and between that and Speymouth; but curiously—and in support of statements we have made elsewhere as to the lines of the Moray Firth migration—comparatively few are recorded from localities farther east than Speymouth, until the area of Dee is reached, which will find its historian in Mr. George Sim.

It is no part of our business to treat of the occurrence of Pallas' Sand Grouse outside the limits of our present area; nor in any way to anticipate the work now being carried on by our principal historian of its movements—Professor Newton (as announced by him in the *Ibis* for 1890, page 207); but we must draw the careful attention of our readers to this paper we have just referred to,[2] as it contains an account of the only positive record known to naturalists of the Sand Grouse having hatched its young in Scotland, and this, too, within our present area.

By a reference to the article by Professor Newton, already noticed, it will be seen that Major Chadwick's keeper—Scott—found young Sand Grouse in 1888, the year previous to that in which he sent one young bird[1] to Cambridge for identification, and in almost the same spot. Curiously enough, however, there seems to have been at least a month's difference between the times of breeding in the two years. In 1888 the young were found at the end of June, and in 1889 it was not until August 8th that Major Chadwick picked up and forwarded the one described and figured by Professor Newton.

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[1] By subsequent careful inquiry on the spot, we could only ascertain that a Mr. John MacGillivray shot two Sand Grouse at Croftmore, near Boat of Garten, and that both were spoiled in the stuffing, and that they were shot out of a flock. Mr. L. Dunbar saw one of these, now in Mr. MacGillivray's possession, in Mr. Watson's (birdstuffer) shop in Inverness, which was 'very shabby' about the head.

[2] *On the Young of Pallas' Sand Grouse* (*op. cit.* Plate vii.).

In connection with the foregoing we give some extracts from Harvie-Brown's Journal of a visit he paid to that district in June 1888, showing how very near he was to being the discoverer of the nest in the first instance.

First of all, Harvie-Brown visited some land in the possession of Mr. Mackessack on the east side of the Findhorn, where the proprietor had been preserving a flock of about twenty-six Sand Grouse. These, after some considerable difficulty, were found. The birds were very wild, and the only thing noted was their plover-like flight, and their low, soft, mellow note, which Harvie-Brown considered was uttered by the leading bird only.

The day following—July 8th—Harvie-Brown, accompanied by Brown, birdstuffer, Forres, visited the Culbin Sands, and we here give a description, verbatim, from his Journals:

'The next day we visited the Culbin Sandhills. Close to where the keeper at Moy shot two Sand Grouse, which we saw in Brown's shop, Brown, who accompanied us, pointed out the weeds upon which they had fed, viz.:—leaves and little berries of wild gale, and the red seeds of dwarf, but large-leaved sorrel. Crossing through some self-sown and stunted birch plants, after passing through a belt of pine-wood, which stretches for miles along the inland side of the Culbins,[2] protecting the agricultural land from the persistent sand-drift, we stepped out on the bent-covered sandhills, bare sand-wastes rising into hills of one hundred feet in height—rearing their bald and dazzling summits far above the bent-covered lower hollows. After a walk of less than half a mile we came upon one of the broken shingly hollows, already mentioned, which showed unusual abundance of the red-seeding sorrel.

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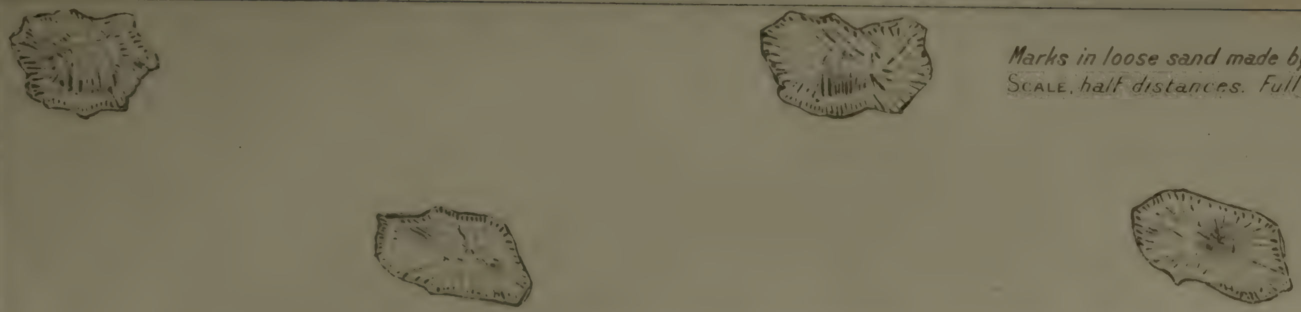
[1] Now in Major Chadwick's possession, in his house at Findhorn; seen there by Mr. John H. Teesdale, August 16th, 1892, as we are informed by him *in lit.*

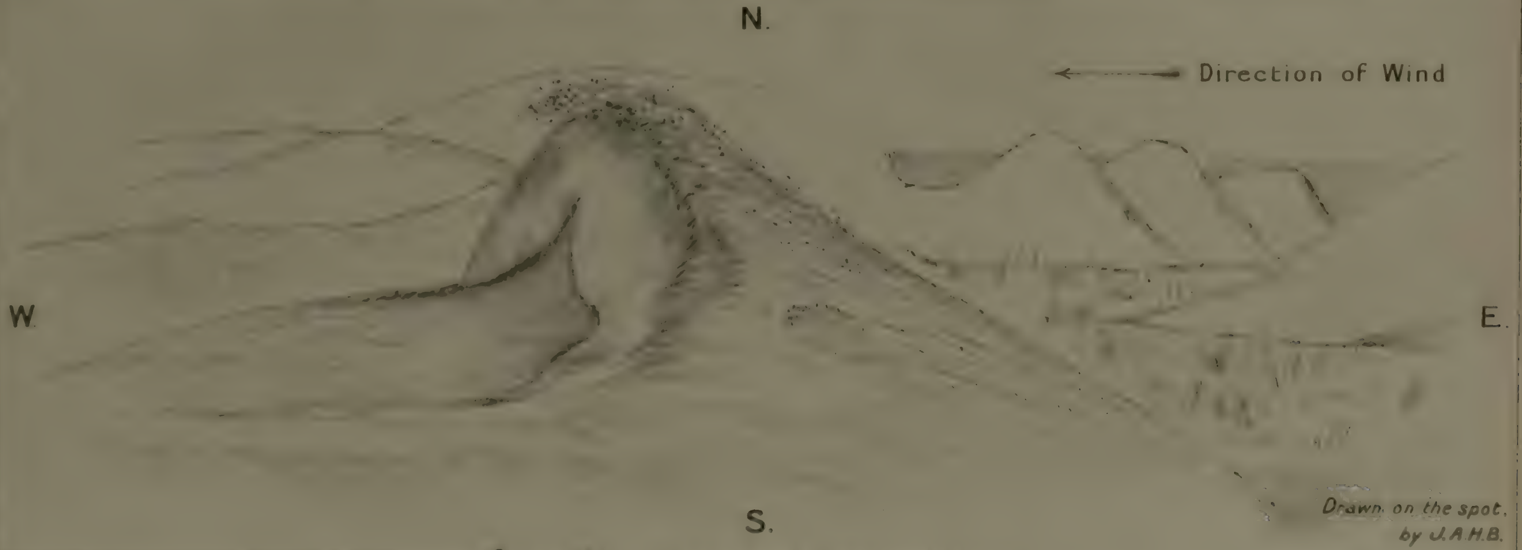
[2] *Kincorth Wood.*

'"There he is! a pair!" as first one, and then another Sand Grouse rose *heavily* about eighty yards ahead, *flying low*, bulking decidedly large, looking very dark in colour, and at first *silent.* Both birds wheeled round, and crossed close to us—say thirty to forty yards off—"wheepling" in the same low tone we heard yesterday. The sound was perfectly indistinguishable from that heard yesterday, when the flock of twenty-six passed at a very much greater distance off. Was it the male or the female that uttered it? I cannot say. They flew no great distance, and did not leave the same hollow. We lay down, and ere long they came round and alighted about one hundred yards off; and this time we got our binoculars upon them. They seemed suspicious, the hen running with head lowered, the cock sitting very upright, and motionless for quite a quarter of an hour. Had they eggs? The hen ran, and was shortly out of sight behind a small sand-hillock. In a little the cock followed, running with an awkward waddling gait, and likewise disappearing. After a time, slowly we rose, and taking every advantage possible of the hummocks among the pebble-strewn hollows, we stalked carefully forward. About fifty yards we had accomplished, and then we saw both birds run crouching over a low ridge of sand and disappear. We ran forward, but they must have gone on, *as swiftly* as we ran, for the distance was kept up fully, and they rose again. We found their footprints in the shifting fine sand of the slope, and indeed all over this hollow, which bore abundant evidence of their presence, and of the proprietorial rights of the birds. A rich amount of feeding of sorrel seed was everywhere present. Their tracks on harder sand or soil are more like those of mice than of birds. In loose sand the tracks were mere oval hollows not clearly defined, the sand, as in a sand-glass, running towards the centre and obliterating the toe-marks. When walking slowly, the prints were quite three inches apart, but on the slope, where we saw both birds run rapidly, they were not more than one inch apart. The gait was rather awkward, duck-like, and clumsy. Perhaps nothing could give a better idea of the footprint in loose sand than the under side of the scale of a Black Bass.

'Scarcely had we topped the next ridge than up sprang a single



Marks in loose sand made by SAND-GROUSE.
SCALE, *half distances. Full size of foot prints.*


N.
← Direction of Wind
W.
E.
S.
Drawn on the spot,
by J.A.H.B.

SAND HILL IN PROCESS OF FORMATION.

bird, from a small sand-hollow, not thirty yards ahead. It was a male. He turned and passed close to us, the breast-markings showing distinctly. He was absolutely silent. Was the female sitting on eggs? We saw the exact spot whence he rose, on the east side of a small tuft of bent. On going to the spot, we found a depression in which his breast had rested in the white loose sand, close under the lee of the bent; and we saw his wing-stroke markings imprinted on the loose dry sand on either side as he had risen. Was he only sheltering? The wind had for days past been dry and easterly. To-day it was from the west. The bird had crouched on the east or leeward side of the tuft of bents. Perhaps we too rashly conceived he was only sheltering, but the marked change in the direction of the wind since yesterday, we fear, aided in the hasty conclusion.' Harvie-Brown wished afterwards he had gently passed the tip of his finger through the loose sand, between the wing-stroke markings. Perhaps, like some other species of birds—like *Anarhyncus frontalis* in New Zealand, the eggs might have been partly covered or beneath the surface. *Quien sabe!* but, continues H.-B.'s Journals, 'this I think I know: had I been alone this day, only darkness would have torn me away from this and the last-mentioned hollow of the Culbin Sands; or if I had had a companion by my side like Colonel H. W. Feilden, our patience might have been rewarded.

'Here ended my second lesson in Sand Grouse—disgracefully, I consider, from the point of view of the collector, and even, possibly, as suggested by a friend, from that of a naturalist. Not very far from this spot the young birds were found by Mr. Chadwick's gamekeeper—Scott—the following year. Eheu!! Still the account bears its own interest, and we are glad that we can be borne out in the facts we have related by our companions of the day—Mr. James Brown and his son.'

The following is Captain Dunbar-Brander's account, which appeared in the *Field*, of eggs in his possession, which we are of the opinion is worthy of reproduction:—

'SIR,—There is a query in last week's *Field* regarding Sand Grouse. I write all I know about them up to date, October 1st, 1888.

'There is a large bare sandy tract of rabbit links runs along the shore about two miles to the north of my house; the rabbit-catcher reported two or three small flocks of strange birds (about thirty birds) as frequenting the ground. This was about May 20th. One was got, and identified as the Sand Grouse; I gave orders that they were not to be disturbed. When the birds had been here about a week they broke up into pairs; this looked like breeding. They remained in pairs for about a week, and then they all got into flocks again, excepting about three or four pairs that remained paired, and could be seen in pairs morning and evening. Reasoning from analogy, those in pairs would be breeding, those in flocks had given it up as a bad job. There are a number of Sea-swallows, Oyster-catchers, and Peewits, that breed on the bare links. The rabbit-catcher told me one day that there were two eggs lying in a slight hollow on the bare ground under a tuft of heather, eggs that he did not know, right in the centre of the ground frequented by the Sand Grouse, and that he thought, whatever bird they belonged to, that they were deserted. I told him to feel the eggs that evening and next morning, and if they were cold to bring them to me—which he did. I blew them myself; though a week in the nest, they had never been sat upon; not a streak of red in the yolk. The eggs at a glance were not to be distinguished from the eggs of a Water Hen; but it puzzled me how a Water Hen would deposit an egg in such a place. (The Water Hen makes a large nest of rushes and dry flags.) I could understand a Water Hen getting her nest destroyed, and, being "taken short," glad to deposit an already formed egg anywhere; but there being two eggs was against this. I wrote to Professor Newton, detailing the circumstances, and he requested me to send up the eggs for his inspection, which I did. He returned them to me, saying he thought they were Water Hen's eggs; about three weeks after I had a letter from Professor Newton apologising for throwing a doubt on the supposed Sand Grouse eggs, and he wrote: "A friend of mine has received some undoubted Sand Grouse eggs from abroad, and he says it is difficult to distinguish them from the egg of the Water Hen." On getting this note of explanation it set me examining the eggs more closely. I had a pair of real Water Hen's eggs to compare them with. I weighed the blown egg of the Sand Grouse in a chemist's shop; it was 34 grains. But I do not think this test of weight of shell can avail much; the thickness and weight of shell all depend upon the previous food of the bird, and also whether the ovaries are exhausted or in full working order. I took the eggs of the supposed Sand Grouse and also the eggs of the Water Hen to an expert in gems, a man accustomed to detect flaws in precious stones. He at once said, "*The textures of these two eggs are quite different; as different as polished sandstone from polished marble.*" He gave me an eyeglass, and I saw it myself. Besides this, the spots on the Water Hen's eggs are brown; the spots on the Sand Grouse eggs, when closely looked into, are a reddish purple. We have seen no young birds, but I think there is no doubt but that I have got a pair of eggs; if I have eggs, some one may have young. As to the birds themselves, they are still here. The rabbit-catcher reports that every morning they come to dabble and bathe on a spit of sand running into the river, just like Peewits; that there are three or four flocks of about a dozen each; sometimes the flocks seem to join, but he says that each flock seems composed exclusively of male or female birds. The male is darker, with an orange mark. There are some bare stunted firs on the links. He says he has seen a flock sitting in one of the trees. I was returning from shooting about a week ago alongside a fir wood. I heard a "sough" of wings, and twenty-nine of the birds passed close over my head when fairly set agoing, not circling to alight. I do not think there is any British bird so quick on the wing; a driven Grouse or Partridge would hardly be in the same field with them; they are as fast as the small parrot that frequents the Indian palm-trees.

'The birds feed on the arable land, very often in a turnip field, and seem to shift their ground about ten in the morning and five in the afternoon. They come to bathe and drink regularly between seven and eight in the morning, and will then let the rabbit-catcher get within gun-shot, though at other times they are very wild. When the birds arrived in May they flew with a cry, "Chak, chak"; now, nothing is heard but a loud "sough" of the wings—no cry. There are great numbers of Terns or Sea-swallows breeding on the ground frequented by the Sand Grouse. A number of eggs of the Tern were gathered and sold as the eggs of the Sand Grouse. I would feel obliged if any one who has an undoubted Sand Grouse egg would tell me if it resembles the Water Hen's egg. I write "Water Hen," as in Scotland moor-hen would mean a grey hen or female of blackcock.

'My egg is not a bit like the egg described in the *Field* as having been laid in the Zoo, but I would think nothing of that, knowing how eggs are influenced both in size and colour by the food. The food in the Zoo would be purely artificial. I see thousands of eggs yearly here in the gullery. The first eggs, laid in April, are the result of worms; the gulls have been following the ploughs. The ploughs stop in May, the gull's food is then chiefly insects, and eggs laid by the same birds in April and in May are quite distinct in colour and thickness of shell; the shell, more especially, is far thinner in the late-laid eggs.'

We think there is every reason to believe that Captain Dunbar-Brander's eggs are genuine. If one pair out of the host of Sand Grouse laid their eggs in such a likely spot on the Moray sandy links, why not more?

Order **GALLINÆ.**

Family **TETRAONIDÆ.**

Tetrao urogallus, *L.* **Capercaillie.**

In Sutherland attempts were made in 1870 to re-introduce the Capercaillie into the county by the late Mr. Chirnside at Skibo and at Ospisdale. One bird survived at Skibo for two years, but finally disappeared, and no further attempt seems to have been made.[1]

Of earlier accounts we have quoted most of the authorities in a previous volume—*The Capercaillie in Scotland.* To these we may add Hector Boece's account:—'Mony uthir fowlis ar in Scotland, quhilkis ar sene in na uthir partis of the warld: as capercailye, ane foul mair than ane ravin, quhilk leiffis allanerlie of barkis of treis' (vide *Scotland before* 1700, p. 84). We may also quote Bishop Leslie, who, writing in 1578, tells us: —'In Rosse and Loquhaber, and vtheris places amang hilis and knowis, ar nocht in missing fir trie sufficient, quhair oft sittis a certane foul and verie rare called the Capercalye to name, with the vulgar peple, the horse of the forrest, les indeid than the corbie, quhilk

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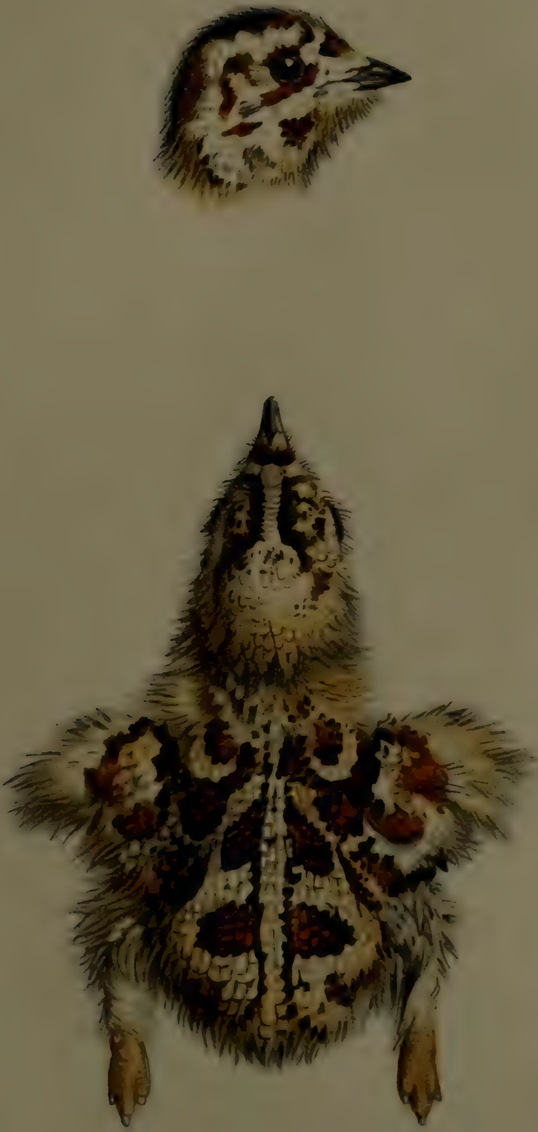
[1] *The Capercaillie in Scotland*, p. 99.



W. Foster del.

SYRRHAPTES PARADOXUS (Pallas) *Pallas*
PALLAS' SAND GROUSE

pleises thair mouth, quha eitis her, with a gentle taste, maist acceptable. Sche lyues of only the tuigs or tendir branches of this trie' (*loc. cit.* p. 138).

We have given the English quotations as above, as in our former account we only give part quotations from the earlier Latin editions.

In order to preserve the chronological continuity of our treatment of this noble species, we offer no apology for quoting what we have already said regarding it in another place.[1]

In Inverness we have the following:—'In Hartings' "Sale Catalogue" of his collection of eggs (Stevens', 6th June 1872, p. 20) occurs the entry:—Capercaillie—*Tetrao urogallus*—two: Guisachan, Inverness, May 1868. E. Hargitt." They were introduced about that time, young birds having been presented to Sir Dudley Marjoribanks by Mr. Mercer of Gorthy, near Methven, Perth; and the year previous eggs were sent from Perthshire to Guisachan. I learn from one correspondent that all the birds at Guisachan have died off.'

'In 1873 birds were introduced at Invereshie, Inverness-shire, but were never fairly established. A cock was shot in 1875, and at present—1878—only one hen is to be seen. There is abundance of suitable cover, extending four miles in one direction, and half a mile broad, and the present keeper has instructions to introduce them again next year.'

Former occurrences of the species in the county are given under previous heads (*op. cit.* pp. 16, 20, 26). This older history is related as just mentioned by Bishop Leslie (*Disc. Reg. Scotiae*, 1578, edition 1675, *Roma*, p. 24), by which it is related that it occurred in Ross and in Lochaber, but is spoken of as 'rarissima.' It is mentioned also by Rev. Lachlan Shaw (*A History of the Province of Moray*, 1775, second edition, 1827, p. 207) as inhabiting the province; and Pennant (*Tour in Scotland*, 1769) has an interesting passage regarding its occurrence prior to extinction in Inverness, which has been often quoted. He appears only to have seen one specimen, which 'was killed in the woods of Mr. Chisholm to the north (*in err.* for west, H.-B.) of Inverness.' The *New Statistical Account* relates in 1845 that 'the Capercaillie or Cock of the Wood was seen in

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[1] *The Capercaillie in Scotland*, 1879, p. 93. *Note.*—A later issue is dated on title-page 1888.

Glen Morriston and the neighbouring hills of Strathglass about seventy years ago, but is now quite extinct'—thus quoting Pennant (vol. xiv. p. 43).

Mr. Muirhead, under date of October 31, 1866, writes:—'Mr. Stewart, head keeper at Balmacaan, sent me a young cock Capercaillie. It had been found lying dead near Balmacaan House. Lord Seafield had introduced Capercaillie from the Duke of Athole's place a few years before this date, but we believe they did not succeed well, as the woods were too old to afford them sufficient food of the proper kind.'

In 1890 we issued circulars once more to those likely to assist us in bringing up the extension of the Capercaillie in Moray to date. This resulted in negative replies from the following estates:—Burgey (Morayshire), Moy Hall (Nairn), all the estates in Badenoch, in the parish of Laggan and Kingussie, and Alvie (Inverness-shire), Dallas (Morayshire), and negatives also from all the Strathspey estates (Inverness-shire), which cover 24,000 acres of perfectly suitable cover for the birds. None have been heard of at the estates of Flichity (Inverness), nor at Cawdor Castle, nor on the Gordon Castle estates.

These returns also resulted in the information that on many of these estates, although their introduction was attempted, it had never been successful up to date.

In the Castle Grant woods Mr. Templeton—whose name we have already mentioned—told us that thirty-two years ago (say 1860) Capercaillies were introduced by eggs placed under Grey Hens. Mr. Templeton accounts for the complete failure by the occurrence of a most unusually severe frost, which he well remembered, in the month of June of that year. This was the direct cause of failure, all the young birds being killed in one night. These attempted restorations occurred both at Cullen and at Castle Grant.

In 1851 Capercaillies were confined in the aviary at Duff House, but the young all died off, invariably from a parasite, or worm in the intestines, as related by the Rev. J. Smith (*Zoologist*, 1851, p. 2980).

In 1866 a female Capercaillie was shot by Mr. William Brown, keeper at Rothiemay, in Glenbarry, supposed to be part of a hatch-out from eggs put down near Keith in the spring of the same year. No other results from this attempted introduction are recorded.

In 1885, when at a meeting of the Royal Physical Society, Edinburgh, Mr. J. M. Anderson mentioned to Harvie-Brown, *viva voce*, that Capercaillies had at last reached into Speyside. At that time Mr. Anderson resided at Strathearn Lodge, Strathearn Place, Edinburgh, but all applications for further information has resulted in no confirmatory evidence, though we applied again amongst the circulars sent out on February 10th, 1892.

In the *Fauna of Moray*, however, edition 1889, occurs the statement:—'The Capercaillie now breeds in Darnaway woods' (*op. cit.* p. 46).

Now, in 1881, when passing Dalwhinnie in the train going south, on the 24th July, Harvie-Brown saw what was almost without a doubt a female Capercaillie sitting on the fence of the young plantation, which has since been—partly, at least—consumed by fire; and from what Mr. Macdonald afterwards told us, this bird appeared to have been frequenting the same patch of wood for about three weeks (*Journals*, 1881, p. 341, *q.v.*).

Again, the same year (1881), on November 27th, a male Capercaillie was shot at Dalwhinnie, close to the hotel, by one of the sportsmen, and we afterwards ascertained that it was killed by a very good friend of our own—Mr. David Lamb. The bird was presented, with a silver plate on the case giving particulars of the capture, to Mr. Macdonald, and was seen by us on 31st July 1885.

How much the said note by Mr. J. M. Anderson bears upon these last-related facts we cannot say, owing to insufficient data, but in consequence of our subsequent ineffectual attempts to hear anything further corroborative, we feel inclined to dismiss its importance, so far as we can see, and to pass on.

In 1891 we received the following account of the Capercaillie at Darnaway from Mr. William Brown (factor on Darnaway), Earlsmill, Forres:—'They occur there now (*i.e.* 1891), and are resident. They arrived of their own accord. There had been an introduction, the Earl of Moray having sent eggs from Doune Lodge (south-west Perthshire) about 1883. These eggs were hatched by hens, but the young birds all died. In the spring of 1883 the keeper saw one cock. The present residents arrived probably from woods to the south of Inverness-shire (query, *via* Dalwhinnie ?—J. A. H.-B.)

'In 1884 the keeper saw a nest of eggs (ten) and three coveys of young birds. They are abundant now (1891). The keeper has seen fifteen in one day in the autumn of 1890. The acreage suitable to their necessities of thriving existence is 4000 acres. They are carefully preserved and are increasing. Black game also are increasing. Capercaillies are also seen occasionally on Coulmony, the adjoining estate to Darnaway.'[1]

Now, 'on the Rothiemurchus estates, Inverness-shire,' as we are informed by the Rev. D. M'Dougall, Rothiemurchus Manse, 'four Capercaillies have been seen several times this last autumn (*i.e.* autumn of 1890). They arrived of their own accord, probably from the Athole Forest across by Drumochter (and Dalwhinnie ? —J. A. H.-B.). There are over eight square miles on this estate, suitable for their habits, and so also are great areas of adjoining estates. If left unmolested they surely will increase.' We are indebted to Dr. Gordon of Birnie for the above interesting notes.

There are other places within our area where introductions have been attempted. Eggs have repeatedly been set, and the birds have been hatched and reared until they were about three weeks old, when they died off. On one occasion, at Gordon Castle, in 1888, there were hatched out under a Greyhen a setting of eggs, and Mr. Cuthbard, keeper there, observed the Capercaillie or Capercaillies on the ground for about a year or a year and a half afterwards. After that all sign of them disappeared (Cuthbard, *in lit.* 1891).

In 1892, Mr. R. Thomson—whose abilities as an observant field naturalist have been of much service to us in this and other connections, in our preparation of a *Fauna of Moray*—writes us (21st May 1892):—'There are a few Capercaillies in the Clunas woods near here—Ferness on the Findhorn. They were,' he adds, 'introduced about eight years ago from eggs, and are carefully preserved by Lord Cawdor and James Mackillican, Esq., of Calcutta.' This account of Mr. Thomson's we are inclined to accept as the true explanation of their appearance at Darnaway and Clunas—an adjoining property—as already related.

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[1] The above replies to our queries will, we believe, call to remembrance of readers of our *Capercaillie in Scotland* the form of circular originally sent out, which is reproduced at p. 54 of the said book (*q.v.*).

But Mr. Brown of Earlsmill informs us (*in lit.* 2nd November 1894):—'No Capercaillies have been seen in the Darnaway forest for nine months.' A keeper told him he knew of 'nine nests in 1892, with an average of about eight eggs in each.' Mr. Brown adds:—'I have no authentic information of the birds having spread beyond the boundaries of Darnaway forest.'

Edward Collie[1] and Carr, keepers in Rothiemurchus, told us in 1891 that five were shot by the Earl of Winchester 'much lower down the valley' than Lynwilg (probably escapes or vagrants from Cawdor, *Journals*, 1891, p. 564, *q.v.*).

The Rev. D. MacDougall of Rothiemurchus Manse says (*in lit.* 2nd November 1894), in reply to our inquiry in reference to the subject of the last paragraph:—'One of the keepers told me that they were seen in Rothiemurchus in a year subsequent to their first appearance, but I do not recollect whether there was a male bird among them, or how many were seen. It will,' he continues, 'be within your knowledge that the male which, accompanying the two or three hen birds which first made their appearance, happened to be shot, and I suspect this was the only cock Capercaillie which came to the district, otherwise I do not doubt that we should have heard of young having been hatched.' We are obliged to the Rev. Mr. MacDougall for this interesting note.

Another introduction took place in the spring of 1886 at Alltmore, on the Duke of Richmond's property. Mr. Cuthbard, the keeper, put some eggs obtained from Perthshire into a Greyhen's nest in the spring of that year. The following year some boys destroyed a nest of a Capercaillie, and no others had since been heard of in the district, unless the one female shot at Glenbarry (*supra*), by Mr. William Brown, keeper at Rothiemay, may have been one of those hatched out from Mr. Cuthbard's setting of eggs—the localities not being far distant from one another.

We are informed by Brown of Forres that an adult male, a cross between the Capercaillie and black game, was found dead near Forres on February 15, 1886. In a letter accompanying the notice of this bird Brown remarks that it resembles the Blackcock in every respect but that it is larger, measuring twenty-eight inches in length, and that the shining feathers on the breast and neck are of the same colour as that found on the neck of a Rock Pigeon. The tail is also like that of a Blackcock, but not so much forked. The bird was found dead in the Darnaway woods, 'where there are still a few more of such exactly the same.' It had a broken leg.

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[1] Since deceased: May 1895.

In 1888 a hybrid male (*T. urugallus* and *T. tetrix*) was trapped by a crofter about six miles from Forres in December 1888. It was taken in the flesh to Mr. Leadingham, birdstuffer, of Caroline Street, Forres, at whose house the Rev. H. A. Macpherson identified it (Rev. H. A. Macpherson, *in lit.* 4th March 1892). Another male of the same kind of hybrid was shot in August 1889, at Loch Loy, by General Baillie.

'A hen Capercaillie was shot last week on the Rothiemurchus estate, Aviemore, N.B., and is believed to be the only specimen ever obtained in Strathspey. Three years ago Lord Winchelsea shot on the same estate a bird which was an undoubted hybrid between a Pheasant and a Capercaillie. This specimen is now stuffed and in the possession of Mr. William Grant of The Dell, Rothiemurchus. The hybrid between Capercaillie and Black Grouse is not uncommon, but a cross between the Pheasant and Capercaillie should be of great interest to naturalists.'[1]

Tetrao tetrix, *L.* Black Grouse.

Widely distributed, but, from what we can learn, nowhere so common as formerly; indeed, it seems to be on the decrease in most places.

To this, however, we are glad to be able to make one exception. Captain Ellice writes us in October 1887, that 'the black game have done very well, and it begins to look like old times again, as I have several times seen forty or fifty of them together.' In 1888 Captain Ellice again mentions that they were still increasing and much more numerous. At Guisachan Lord Tweedmouth and party killed eighty-seven birds in six days' shooting in November 1889.

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[1] Daman (*Field,* November 4th, 1893, p. 712).

From Sutherland we hear that this decrease in the black game still continues. Although preserved for many years at Badenloch, the increase was scarcely noticeable, and certainly would not compensate for the decrease elsewhere. In some parts of that district of our area they have been practically extinct for many years, where formerly they were very abundant, and we ourselves have noticed their gradual decrease for more than twenty years.

Millais remarks the same thing in regard to the Black Isle at p. 30 of his *Game Birds.* It is now a difficult thing to get a few brace for the table at localities where formerly they actually swarmed.[1]

Black game are great wanderers. At a shooting we once held in East Ross-shire, black game were very plentiful in a glen that was noted for the abundance of 'blaeberries' growing there. We shot very few in the early part of the season, trusting to get them later on, by driving, when the birds would be good and give more sporting shots. However, when the right time came we found very few indeed, and at last they were not worth the trouble of looking after, having shifted their quarters elsewhere.

St. John, writing of black game, says:—'Though nearly allied to Grouse, and though mules between Black Grouse and Pheasants are not very rare, I only know of two specimens of mule birds between Black and Red Grouse. I have seen other birds which have been supposed to be a cross between these birds, but they have generally appeared to me to be the hen of the Black Grouse gradually changing her plumage to that of the cock, which they do in the same manner as the Pheasant does. One of the specimens is in the Edinburgh Museum, and has the distinguishing marks of both its parents most decidedly' (*Natural History and Sport in Moray*, pp. 221-2).

The *O.S.A.* gives Mortlach; Cromdale; Moy and Dalarossie (Findhorn), Kirkmichael (Spey), as localities, all of which are south of the Ness.

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[1] [In 1895, however, and for two or three years previously, black game have been decidedly more numerous in Strathnaver and its vicinity, but more to the east. This increase does not appear to have taken place to any appreciable extent, and on some shootings they are as scarce as ever. To this side-light we may add that a very general increase was observed over many parts of Scotland during the time mentioned.]

Edward says:—'Exists chiefly in the higher districts.' This is scarcely our experience. Dr. J. O. Wilson does not consider it very abundant around Huntly, and it is not numerous in the higher districts of Cabrach, but it is included in all lists from Cullen, in the north-west part of Deveron inland, over most suitable areas, such as on the Knock and Bin hills and the Bin wood of Huntly, and fairly common about Rothiemay. We did not find it very common about Keith, but much more so at Auchluncart (Mr. Stewart's), where we have shot them. Over all the district and watershed of Deveron, however, it cannot, perhaps, be described as common or abundant. It is much more abundant on Speyside, still more so in Strathspey and in the great woods or adjoining moors of the Spey plateau, and Rothiemurchus, Abernethy, and Duthil. It is more local among the valleys of the lower tributaries of Spey and of the Carn districts. Some years they appear very abundantly about Castle Grant, whilst in other years they are quite as remarkably scarce. Mr. Templeton had often made such observations, and accounted for this fluctuation in numbers by the changes taking place during many years in the face of the country—drainage and planting and general land improvements, and consequent physical changes. Mr. Templeton gave us the impression of a very shrewd and most intelligent observer, having used to the utmost advantage his long experiences in one or two localities whilst serving under the Seafield family.

Of large and decided increase of black game on several estates and shootings we can positively speak, both in our present area and on shootings of our own in central Scotland;[1] and what is curious, and perhaps of even greater interest, these instances of increase of black game have run concurrently with the decrease of Grouse and with the institution of driving and killing off old cocks.

On the other hand, Mr. Brown of Earlsmill, Forres, in reply to our inquiry as to increase or decrease of black game on Lord Moray's property, informs us:—'They are just about the same in numbers as when I last wrote you. They are perhaps a little more numerous this season (1894). No old cocks are shot, and there is no alteration in the condition of the ground.'

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[1] This has now been done on our own shooting above mentioned, steadily for some years back, where packs can now be seen of twenty, thirty, fifty, and even a hundred together about the middle of our driving season. Before we took to driving this moor, the keeper was told off to shoot *old cocks only* at the feed, and the first year he got these orders he killed over seventy. A notable increase of birds was evident even the very following year, and in 1893 we four times broke our record bags, and actually split up and dispersed a huge pack of over eighty birds.

Lagopus scoticus (*Lath.*). Red Grouse.

Local Names.—Muir-hen, Muir-fowl.

Just as surely as driving increases the number of Grouse, so surely does turning grouse-ground into deer-ground decrease them, the cause that operates for that increase in the one case being naturally absent in the other. And not only that, but there are few forests wherein ordinary shooting after the stag-stalking season is over is permitted; thus the ground gets stocked with nothing but old birds, which drive out the younger ones, besides which the old birds become less prolific with age. Again, burning is not conducted on the same lines in the one case as in the other. The grouse-ground is, or should be, burned with a close regard to the acreage of the whole, as well as to the description of ground burnt, because heather in some localities will reach its best condition in five or six years, whereas in others it will take double that time, or even more, to do so. In forests much larger extents are burnt, and provided good patches are left in these places for the deer, well sheltered from the cold winds, the amount burned is of little moment. It is almost superfluous to add that vermin in a forest is not so closely looked after as on a grouse-moor. All these things tend to the preservation of grouse on the one hand, and their deterioration on the other.

At Guisachan, Grouse are not nearly so abundant as they were formerly, though part of the ground is used as a grouse moor: but of late we have noticed that there is much more *partial* disease than formerly, and that whereas, years ago, disease made a clean sweep, after which it died out and the birds got as abundant again as ever, now it hangs about, and though perhaps never so devastating as before, still never allows a really full stock to get up. This, at least, is our experience in Sutherland and two other places in the northern part of our area.

In Sutherlandshire this partial disease is very apparent still, and from some cause or other the Grouse are much more shifty in their habits than in any other place we know of. Nor do they lie so well to dogs at the end of the season as formerly, though driving is only resorted to on one or two moors. On the flatter grounds about Badenloch they are much more inclined to lie than on the hilly grounds near the coast-line. In the former situation we have known of 25½ brace being killed over one dog on a short November day; but then the dog was a *red* Irish setter, *not* a *white*, or *partly white*, coloured dog.

A few Grouse are to be met with on the hills above Nigg, and also on the Black Isle, but in the latter place they are a diminishing quantity, owing to the moors being reclaimed or planted.

At Invergarry, Grouse are not as numerous as formerly, but this Captain Ellice puts down not only to disease, but to the enormous number of Hooded Crows, which swarm out of the neighbouring forests, and defy the efforts of the keepers to keep them down. In 1888 Grouse were very scarce there, and Murdoch Matheson told us that on July 15th hens were sitting and others only just laying.

A dry hot season suits these birds best. We well remember going over a small moor in the east of Ross-shire on a very hot day in July 1887. There was only one spring on the ground, and a small dirty mud-hole, yet by the opening day these birds were abundant and well grown. As in very hot weather dew is very plentiful in the early morning, possibly the birds get a certain amount of moisture from the dew-drops.

Grouse seem to get wilder on hilly than on flat ground, provided the flat ground is broken up by *runners*, and the heather is neither too rank nor too uniform in character and height.

Crosses between Grouse and any other species of game-bird are rare, and the following, taken from the *Inverness Courier* of September 6th, 1889, may be of some interest:—

'On Friday last, Mr. Macleay asked Mr. T. E. Buckley to examine a bird which had been sent in from Glenmazeran for preservation, shot by Laurence Hardy, Esq. The bird is a hybrid between a Grouse and a Blackcock or Greyhen, and is a male. The neck and back are coloured like any ordinary Grouse, though perhaps the back may be slightly darker than the general run; the breast, with the exception of a few white feathers, is glossy black, but this colouration is by no means uncommon amongst cock Grouse. The head, tail, wings, and feet show the cross with the black game most strongly. The beak is large, and the comb extremely red for the time of year; the tail is exactly that of a young Blackcock, but shows no sign of curving in the outside feathers. The wings are peculiarly marked, and resemble to some extent those of a Capercailzie cock, especially as regards the wing coverts; but Mr. Macleay says he has seen this colouring in the wings of Greyhens sent from Jura, and which had all the appearance of being very old birds. The legs and feet most strongly showed the black game strain, and seemed quite as well adapted for perching as those birds. The bird itself was rather under the size of a Greyhen, and weighed 2½ lbs.; it was shot amongst some juniper bushes.'

A still finer example of this hybrid was shot near Ardgay in December 1894:—'This bird is a male, very dark, and showing the Red-Grouse feathers here and there on its glossy black breast. The head and tail are distinctly those of a Greyhen, and the plumage is much spotted with white. The toes are feathered halfway to the claws, the rest quite bare, and they show the pectinations distinctly, though not to such an extent as true black game. The legs are well feathered' (*Annals Scot. Nat. Hist.*, April 1895, p. 125).

Edward does not appear to have considered the Grouse as abundant on the moors of Banffshire. He says:—'Exists on all our moors, but not in great numbers.' We can only consider that either Edward was speaking of their numbers, comparatively with those of other large areas of Scotland, or, that his personal experiences were confined to a very limited area near his native town.

The Red Grouse is abundant in the Upper Cabrach and Upper and Middle Deveron, and all round the rim of encircling hills of the Duke of Richmond's moors and forests, as far down as Huntly. It is perhaps a little scarcer between Huntly and the sea—east or north—but it occurs on suitable areas even as far as the summits of the cliffs near Troup Head, diminishing in numbers as the appropriate areas are contracted. It is abundant again, however, by the head waters of Bogie, by Tap o' Noth, and by the head waters of Isla, around Keith and the Balloch hills; scarcer on certain reaches of drier hill below the Upper Cabrach, but again plentiful about the hills of Glass, Beldornie, and Braemore, and behind (*i.e.* south of) Huntly.

Speaking more generally of its distribution in Moray, it may be considered as universally distributed wherever suitable areas occur; and the Moray Basin contains some of the best grouse-muirs in the kingdom, from Dalwhinnie and the farthest watersheds down to the lower spurs of the Cairngorms and the Carn districts, Lower Banffshire, and the Braes of Moray, and the watersheds of the Findhorn and Nairn rivers, which form a second Carn district, distinguishable from what we call 'the Carn District of Spey.'

Grouse-driving in many parts is coming more into vogue than formerly, and there is every reason to believe that this 'resource of civilisation' will be the means, as it has been farther south, of increasing the amount of Grouse, for reasons it would be an act of supererogation for us to occupy space in explaining, when we have so much already within our reach written on the subject. At present, so far as we are aware, grouse-driving is not practised much, or at all, in the deer-grounds of Glen Fiddich, or moors adjoining, but the practice is being more and more resorted to north-west of the Spey valley. And principal amongst famous driving beats in that district are the fine moors of The Mackintosh, at Muckrach Castle, Mealmore, and Moy Beg, and elsewhere among the Carns of Findhorn.

In the severe winter of 1878-79 a pack of Grouse was seen crossing the Moray Firth in December, making for the Banff coast, as we were informed at the time by Sheriff Mackenzie of Tain (*Proc. Glasg. N. Hist. Soc.*, Sept. 30, 1879, p. 167). Much snow was lying at the time in East Sutherland and Caithness. An unusual assemblage of Grouse is mentioned by Mr. J. G. Millais as observed upon the flats near Moy Hall (*Game Birds, etc.*, pp. 48, 49).

Mr. J. G. Millais, in the work just referred to, describes the manner of poaching by 'the hidden hand' as practised in the county of Banff, and gives a suitable illustration.

In the late Campbell Macpherson's aviary at Drumduan, Forres, a Grouse laid six eggs in 1886, and hatched six birds. These lived, apparently in good health, for some weeks, but gradually died off—the last about the end of July,—the old female and then the male also dying without any perceptible reason. They were all fat and in good feather.

As the treatment of heather and grouse ground has been largely written of in sporting volumes, we only mention it here from the naturalist's point of view—viz., to illustrate the natural and undoubted sequence of cause and effect upon the species. Neglect your ground and under-shoot your old birds, do not break up your coveys, encourage old cocks, over-burn or under-burn your heather, preserve your Hooded Crows or employ lazy keepers and trappers, *spare* your birds after a disease year and leave a sickly stock, and the effects will soon become patent.

On the other hand, rigidly attend to your ground, kill all old birds, or as many as possible, break up your packs and coveys determinedly, day after day if possible, and make sure of doing it by constantly knocking them about and mixing them up, burn say one-tenth of your old heather every year (having care as to localities and seasons), slay every Hoodie Crow *every year*, for, if left one year on say 5000 acres unharmed—or on 50,000 acres, as in many deer-forests—there will be enough reared there to prove a pest to every other area around. In a disease year, where *disease* is local, kill *every bird* you can by fair means or foul; clean out the scourge, and your neighbour's healthiest birds will soon find out your cleaned ground. Grouse will migrate miles, even across sea, to search for good heather and healthy conditions. If you introduce fresh blood bring the hens from one part, the cocks from another, and not all from the same district, unless you desire to see them get into companies or packs, and 'go back,' or go off in search of *better* heather elsewhere. We do not ourselves believe in introducing large numbers of birds at the same time: rather would we do this gradually and steadily year by year, and rather more hens than cocks, unless you can be sure of your cocks being all young birds. We could mention several successful renovations, and indeed have already done so in previous volumes, and here will only refer to one other, viz., the introduction of Grouse (and heather) to sand-wastes, as exhibited upon Tents Muir in Fife, or to islands, as successfully done in Rum, or, turning to voluntary immigration, as at Gigha Island, near the Mull of Cantyre. One word more :—is it good sense to bring into a new country, which has confessedly inferior ground, and not *as healthy-conditioned*, a large stock of healthy fresh cocks and hens, say from one of our best English or Perthshire moors, and expect these birds quietly to settle down and colonise? And yet this is what several gentlemen, who desired to improve their stock, have told us they have done—thus, in our opinion, flying in the face of natural conditions which stare them in the face all around.

Lagopus mutus, *Leach.* Ptarmigan.

The Ptarmigan is found on most of the hills in the north of our area that rise above 2000 feet, in greater or less numbers: they are perhaps most abundant on the high hills that form the watershed between the east and west coasts. On isolated hills the birds are less plentiful, possibly because there is more 'in-and-in' breeding, the distances between these places making it a matter of some difficulty for the birds to move backwards and forwards. Meall Fourvonie is one of these cases, for although Ptarmigan are found there, yet from the notes of Messrs. Muirhead (1867) and A. Craig (1882) they appear to be by no means abundant.

In the Sutherlandshire part of our area the two Bens Griam are examples of these isolated hills, and there Ptarmigan are only occasional visitants, though they do breed at times. A single bird was seen on the Craggan (a hill on the Torish shooting, on the march between Sutherland and Caithness) on Sept. 24th, 1891, and again one, probably the same bird, on the same hill, a few days later. This is the first that the keeper had ever seen on the ground during nearly fifteen years' experience.

Captain Ellice informs us that Ptarmigan are very plentiful at Invergarry (1886), and still increasing (1888), but here, different from Meall Fourvonie, they have a much more extended and continuous range.

Murdoch Matheson told us that when living at a house pretty high up on the hills above Loch Garry, on May 25th, 1888, a Ptarmigan, chased by a hawk, took refuge in the byre, and was very easily caught.

Mr. Hoy has the note :—'Feeds upon heath-tops and leaves of *Viccinium vitis-idæa*, a considerable number of which were taken out of the gizzards of some sent to France to Monsieur —— in November 1815. The leaves were sent back to Gordon Castle to ascertain what plant they belonged to.'

Edward says:—'Less frequent than Grouse and black game in his district: only in the higher districts.'

It is reported as breeding in small numbers on the rounded mossy hills of the Glen Fiddich deer forest and Carn district generally, amongst scaurs and wind-swept patches, denuded of the shallow skin of soil and heather, which occur here and there on the higher and steeper slopes. There is no doubt it breeds regularly on Ben Rinnes. In 1884 about three brace were shot there by the lessee's party, and a lot or covey of about fourteen birds was regularly seen. Amongst the lower hills of the Carn District of Spey, however, it is certainly rare. Mr. J. G. Phillips, sometime Curator of the Elgin Museum, and author of many delightful sketches of local interest, says:—it is 'somewhat rare amongst the hills of Glenlivet' (*Elgin Courant*). As early as 1844, Dr. Gordon spoke of the Ptarmigan as occurring on Ben Rinnes and all the high summits from 2000 to 4000 feet (*Fauna of Moray*)—a general distribution which it is quite possible was correctly described when he wrote. At the present day it requires, perhaps, some slight modification.

They are still, no doubt, abundant on the high ranges of the Cairngorms, and on all, or nearly all, of the hills which compose the range, but when we come to the lower elevations, say down to 2000 feet—or the carns of the Carn District of Spey or of Findhorn, or the lower ridges of the Monadhliath, such a general distribution can scarcely now be held to be maintained. There are certainly a few on the quiet and undisturbed ridges of the Glen Fiddich and Blackwater forests. Curiously, they appear to have deserted the Buck of Cabrach (2368 feet), whilst still occupying hills of considerably lower altitudes.

Dr. J. O. Wilson says he is not aware that it 'occurs on any of the hills of the drainage area of Bogie or Deveron. Hinxman speaks of it as occurring on Morven; and, since he told us the above, he has been assured by the Clachandarroch keepers that they sometimes occur on the Tap o' Noth; but apparently only specimens in winter plumage have been obtained, or are in evidence. Sim has also obtained specimens from Bennachie—of similar or approximate height with Tap o' Noth. They occur also on the higher ridges of the Cromdale hills, but whether as breeding birds or autumn or winter vagrants we cannot say. There is scarcely any doubt, however, that a few do breed in the Carn districts, and that they vagrate out to surrounding hills.

Of their distribution among the higher mountains where everything is suited to their necessities, it is scarcely necessary to enter into details. Their distribution is general over all these ranges, and perhaps nowhere in broad Scotland are they anywhere more abundant, and also, perhaps, less disturbed, than on the vast ranges of the Cairngorms.

Family **PHASIANIDÆ.**

Phasianus colchicus, *L.* Pheasant.

Common wherever the nature of the ground suits these birds, and where they are afforded proper protection as well as being hand-reared. Being great wanderers, they appear at times in curious places. Thus they are occasionally shot at Heatherley, close to the town of Inverness, and even in the garden of the Bishop's Palace, as Mr. Formby, one of the College masters, informs us (19/xi/89).

Pheasants, however, do not flourish any distance up a Highland strath, or where hand-rearing is not practised, unless the cover and feeding are exceptionally good. Thus they have practically died out of the Helmsdale strath, where we can remember them as being quite common. Two years or so ago we used to see about three hens in one spot, but no cock; at Suisgill, higher up the same strath, they are quite extinct. The same thing has happened at Rosehall, where a few were introduced about 1875.

Pheasants are found about Tain, though we know of no hand-rearing in that direction, probably stragglers from Tarbert and Balnagown. They are abundant at Fairburn, Beauly, Guisachan, Glenurquhart and Invergarry, in all of which places they are reared and well looked after.

The *O.S.A.* is suggestively silent as regards the species within the boundaries of Deveron or of Moray faunal area, but the fact is only stated for what it is worth, considering how few parishes are treated of at all, as regards their zoological aspects.

Edward says:—'Introduced. Thrives well.' Smith adds:—'Abundant in Lord Fife's plantations.'

Now, at all events, the Pheasant is abundant in all the woods wherever cared for, around all the properties on Lower and Middle Deveron, and as far up as Beldornie. The soil and aspects of Lower Deveron appear to be eminently suited for Pheasants, as without annual hand-rearing—or only occasional rearing—large bags are often obtained. Over 600 were shot on one property in one season—certainly a large extent of shooting, being over 30,000 acres. These were all wild bred birds of that and the previous season, 1890. Sixty-four were shot one day out of one small spinney.

The merciless cutting down of timber, and what appears to us to be a wrong system of forestry, very different from that pursued upon the best-managed forested estates of Spey, and even of Deveron, will no doubt alter these circumstances in time. But if—as ought to be—the old woods are renewed by extensive planting, on an improved system of forestry, the same conditions will again supervene, and Pheasants become as numerous as before; but successions of growth will in many places now be difficult of attainment, as such extensive areas have been denuded all about the same time.

Dr. J. O. Wilson recognises the increase of Pheasants, owing in many places, of course, to hand-rearing. The fine weather in 1887 proved a good hatching-out season for wild birds also, and Dr. Wilson saw them all over the country in places where he had never seen them before.

On the Upper Spey valley Pheasants are not abundant, as we have indicated, except where reared and encouraged. About Lynwilg they are abundant, and were heard continually calling in 1891, yet in 1889 a keeper told Mr. R. H. Read that there were none in the district, because it was too cold.

A Pheasant was shot at Glen Feshie in October 1888, by H. J. Tollemache, Esq., M.P.

Hinxman includes it in a list from Glen Avon and district, and says:—'At Ballindalloch, whence it strays some little way up Strathavon.' The Pheasant is reared and preserved also near

Forres. It is said that they were at one time abundant in Tarnaway and the lower coverts. The *New Statistical Account* says :—'A few years ago, prior to 1845, there was a good show of Pheasants in Troup plantations, but the quantities of vermin at that time are supposed to have decimated them. Pheasants occurred—*i.e.* had been turned down—as far north in our area as Conon' (*op. cit.*, vol. xiv. p. 368).

When Brown, gamekeeper at Rothiemay, was lifting Pheasants' eggs in 1892 amongst heather, he found eggs so placed to be blotched or speckled with brown. We have not seen any such eggs, but Brown seemed sure they were true colour-markings, and not, as we suspected, only colour-stains.

Pheasants are not largely reared in the districts of Spey where there are swarms of ants and ant-hills, which one would suppose would prove delectable feeding for the birds. A few occur about Tomatin. They are rare in the great pine forests, where they do not succeed well, and where rearing has been to a large extent abandoned, but they are commoner in the smaller coverts, where they find more encouragement.

A few Pheasants are reared about Dunachtonmore, near Kincraig (William Evans, *Scottish Naturalist*, January 1891); and in the woods which stretch along the edge and west end of the Culbin Sands, by Loch Loy and Loch of Litie, Pheasants are not scarce, many, however, being hand-reared on Major Chadwick's and adjoining property. They are also abundant on Gordon Castle grounds, and among the gorse- and broom-covered banks of Speyside.

[*Obs.—Phasianus reevesi*, Gray. Reeve's Pheasant.—The first year these birds were tried at Guisachan twenty odd birds were reared. These kept together until the month of October, when all left, except some three or four. These birds, instead of going straight down the valley, took across the mountain ranges, some of which are very high, and were found at Brahan and Contin. On one occasion a hen was shot by a gentleman shooting Ptarmigan. Since then Lord Tweedmouth has been more successful, and the birds are now thoroughly acclimatised, though even yet they are inclined to wander down the strath. They are more gregarious than the common kind. The cocks in the breeding season keep pretty well together, and also the young birds when first they leave the coops, and, until the flock breaks up, are very apt to rise in one lot when flushed. They are swift fliers, and make a great noise with their wings when flying. Their eggs are like those of the common Pheasant, but slightly larger.

When at Guisachan in May 1892 we saw about a dozen cocks all together—a very pretty sight.

Reeve's Pheasants are also common at Balmacaan, and hybrids between them and the common Pheasant have been killed there—one in July 1880, another in 1887.

Reeve's Pheasant has been introduced at Duff House within the last year or two, and examples have strayed to and been shot near Huntly. We told the keeper at Duff House that these handsome birds are worthless as game-birds, and that elsewhere where tried (as at Tulliallan in Forth), orders had to be issued for their destruction. They hector it too highly over the other Pheasants, and, when flushed, 'go to tree' after a long flight, and select always the densest they can find, thus affording little sport. They had also been introduced at Pitcroy opposite.]

Caccabis rufa (*L.*). Red-legged Partridge.

Murdoch Matheson informed us, while at Invergarry in May 1892, that a Red-legged Partridge had been shot there that year, and that a pair were still in the neighbourhood.

Edward speaks of this bird having been recently introduced, but we could hear of no other record for many years. In 1890, however, Brown of Forres wrote to Dr. Gordon, saying:—'I have a fine specimen here of a Red-legged Partridge shot near Findhorn, 23rd December 1891, by John S. Clark. A record also occurs of one shot at Rafford in 1870' (*Fauna of Moray*). Now, Captain Dunbar-Brander writes us that he turned down four pairs of these birds two years ago, but they disappeared from his ground. One was shot at Covesea, and Captain Dunbar-Brander heard that there is a covey near Roseisle. Captain Dunbar-Brander goes on to say:—'The country is now so overrun by poachers netting at night that the grey birds are getting very scarce. My reason for turning down the Red-leg is because they sleep in much rougher ground than the grey bird, and are thus comparatively safe from the poachers—better the Red-leg than none at all.' There seems little doubt these introduced Red-legs have travelled westwards—a curious fact which usually seems to result from introductions of a similar nature. It would be interesting if any more statistics could be collected showing any extension of the bird further than we are at present aware of. But we cannot help thinking it is a mistake to introduce Red-legs anywhere, knowing the pugnacious and overbearing disposition of 'these Frenchmen.' We know how 'that Frenchman' is detested in Cambridgeshire, where he is only fit for being *driven.*

Another specimen was shot near Findhorn on September 20th, 1892 (W. Brown).

Perdix cinerea, *Lath.* Partridge.

Local Name.—Pairtrick.

Fairly abundant all through the cultivated parts of our area wherever they are afforded sufficient protection. Pairs are frequently found far up the lonely straths at some shepherd's house, where they rear their brood and remain until driven down by the winter's storms, a pair, but no more, returning in the spring to take up the old quarters of the previous year.

All through the east of Ross-shire Partridges are very abundant, the dry soil in so many places exactly suiting them. Indeed, they would become much more so but for the want of hedges in which to nest, and the great amount of poaching that is carried on, especially in the neighbourhood of Tain and Evanton.

Occasionally a pair of Partridges will take to the hill, quite away from any houses, though the locality would appear to be unsuitable to their requirements—some old 'toun' being sought out.[1]

At Guisachan, where, though far up the glen, the Beauly valley is low, well sheltered, and cultivated, the birds do well, and the keeper informed us that as many as twenty, and even thirty, brace have been killed there in one day.

The *O.S.A.* has a good many references, as follows:—Kirkhill (vol. iv. p. 114); Rothiemurchus and Duthil (*loc. cit.* p. 290); Kilmalie (vol. viii. p. 423); Grange (vol. ix. p. 581).

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[1] In the county of Stirling there are abundance of what sportsmen know by the name of Hill Partridges.

We found the Partridge common about Aberlour on Spey in May 1884. We have met with stray pairs and coveys as far above the sea as Tomintoul and in other parts of the Carn districts. They bred at Dalwhinnie—supposed to be for the first time—in 1885. A few are found in Glen Fiddich, and they are vouched for at Tomatin (Findhorn) by Mr. M'Bean of Tomatin. Common and abundant still in some parts of the Laigh of Moray, notwithstanding the raids by poachers, and very fond of the broomy knowes along certain portions of Speyside and Strathspey, especially about Grantown. Backhouse, in 1891, heard one calling close to Loch Errochd.

A pair of Partridges breed every year as far up Glen Avon as Inchrory, but do not increase (Hinxman).

Partridges are not reported to be so numerous as over the watershed into Ythan and Dee and Don-side, but occur in the usual proportions between the highly cultivated areas and lower reaches, and the higher-lying hill-sides, whether cultivated or not. 1891 and 1892 were bad breeding seasons. Dr. J. O. Wilson speaks of the Partridge as nearly exterminated at one time by severe winters, but now again abundant in the neighbourhood of Huntly.

The variety or so-called *Perdix montana* of Jardine (vide *Naturalist's Library: British Ornithology*, vol. iv.) has occurred near Portsoy, where two were shot by General Shaw,[1] and were preserved by him; and another is in the Museum at Banff. Mr. J. Grant of Glen Grant also reported to Mr. J. G. Millais that there was an undoubted hybrid between a Grouse and a Partridge in the possession of Mr. Allan of Elgin (*vide* Millais, *Game Birds and Shooting Sketches*, p. 60). We suspect this will turn out to be the variety *Perdix montana*.

Coturnix communis, *Bonnat.* Quail.

North of the Great Glen Quails have been obtained as far north as Brora, and also in the neighbourhood of Dornoch, and the nest has also been found in that district.

Macleay told us that Lady Ross turned out Quails at Balnagown. We never heard whether they succeeded or not, or for how long after they were seen in the neighbourhood, though we heard of some there in 1887. Two Quails were killed at Rosehaugh in 1882, and in September of the same year one was killed near Tain. Another was killed at Ardross on October 2nd, 1889. The year 1893, with its exceptionally dry spring and summer (of which we have before spoken in our introductory chapters, proved to be a great Quail year at many usually frequented Quail haunts upon our coasts. Especially were they in evidence in the district of 'Forth' around Edinburgh, as recorded by Mr. Wm. Evans in *The Annals of Scottish Natural History*, October 1893, and doubtless, were a special inquiry instituted, these birds would be found to have visited many other favourite localities in unusual numbers.

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[1] General Shaw was shooting tenant of Netherdale and also of Glassaugh some years ago.

Judging from the description of the note given us by a friend, it would appear that Quails were heard at Culgower, on the east coast of Sutherland, in July 1893. The same year two were shot within a few days of each other at Moniack Castle, near Beauly, in the first week in August. Another was killed at Fortrose at the same time by General D. Macintyre, V.C.; and yet another at Clachnaharry, Inverness, about August 24th of that year. Quails were particularly abundant in Glen Urquhart that same season, as we are informed by residents there—by Major Grant, Glen Urquhart, and others.

The *O.S.A.* only speaks of Kirkhill as a locality for Quail, and the *New Statistical Account* says they are frequently shot in Ardersier parish, where young broods are sometimes hatched out (*op. cit.* xiv. p. 460).

St. John, though he never found their nest, used to hear their call-note every season in May and June, and sometimes to see them in the young grass and corn. Scarcely a shooting season passes, he adds, without one or more being shot, especially about Duffus. One was killed near Cawdor in December.

They breed occasionally on Mr. Mackessack's ground near Forres. Harvie-Brown saw eggs in his possession, taken upon his farm, Newton Struthers, near Forres.

Mr. Duff and several other sportsmen find it annually in the neighbourhood of Elgin (*Fauna of Moray*). It is, however, of only very rare occurrence near Forres, as we are assured by Brown, who preserved one about 1885, which was struck down by a hawk in the streets of Forres. It is now in the Forres Museum.

Quails were introduced on Rothiemay estate by the present keeper, Mr. Brown, about seven years ago, but all disappeared in time, though a few were heard or seen by the people for a year or two afterwards (Brown, *viva voce*, 1st July 1892). It is spoken of also as occurring near Cullen by Mr. James Stephen, gamekeeper there. Edward mentioned it also long ago, and Rev. J. Smith records a nest with twelve eggs found in a hayfield about six miles from the manse of Turriff, in the parish of New Deer (Dee), in July 1848 (vide *Zoologist*, 1848, p. 2302). The people on the farm there reported to Mr. Smith that they find a similar nest there every year. In 1893 we saw Quails' eggs collected by Mr. Thompson of Gollachy upon his own farm near Port Gordon.

Mr. Rose of Holme Rose found one nest within a hundred yards of his residence near Nairn, and he writes us he has some of the eggs still in his possession.

It would thus appear that the inner portions of the Moray Firth are the localities where occurrences of Quails' nesting have oftenest occurred, and from the earliest recorded dates.

In the *Aberdeen Free Press* of the 18th May 1893 occurs the record of a male bird near Montcoffer Wood in Banffshire. The gardener at Inverichny heard the bird strike the wire fence at the roadside, and he picked it up. Mr. Paterson, the gardener in question, has presented it to the Banff Museum.

Brown of Forres writes that an unusual number of Quails made their appearance in that district during the months of September and October 1893. He examined two shot near Forres, and heard of several more having been seen there. They were also shot in the parishes of Kinloss and Alves in the county of Elgin.

Captain Dunbar-Brander heard of none, or at least saw none, at Pitgaveny, though he considered the early harvest favourable to their being observed. In former years he has killed them in his neighbourhood.

[*Obs.—Francolinus vulgaris*, Steph. Francolin.—Hearing that some Francolins had been turned out at Newmore, Ross-shire, we wrote the proprietor, Mr. G. Inglis, and now give his information in full :—

'A friend of mine sent me home thirty (Black Partridges) some years ago from Kurrachee by the Hall line of steamers. They were sent in beautifully fitted boxes, and twenty-seven of them reached here alive, but some were rather bruised about the head from knocking themselves about, and did not live very long. I put them first into the Pheasant yard, and after a few days turned out half a dozen, none of which I ever got a glimpse of after. As the others gradually drooped off I took the remaining seven or eight into the vinery, where they lived a couple of years, and the two last survivors I had stuffed, and they are now in the hall. I fear this climate is too cold and damp for them, and they were very wild in confinement. They never attempted to breed. My friend Mr. Coghlan, who sent them to me, is still at Kurrachee, where he is the Magistrate.—Yours very truly, (Signed) GEORGE INGLIS' (*in lit.* 13th October 1894).]

Obs.—Meleagris gallopavo. Wild Turkey.—Captain Ellice writes us that his uncle, the late Mr. Ellice, M.P., of Invergarry, turned out some wild American Turkeys there. 'They are getting wilder, and go every night almost a quarter of a mile into the woods to roost; but for a long time they were as tame as the domestic birds' (*in lit.* November 28th, 1885). In another letter, dated December 21st, 1887, the same gentleman writes us that 'the wild turkeys bred in the woods this year, but they are still very tame, and have to be fed in the winter.']

Order **GRALLÆ.**

Family **RALLIDÆ.**

Crex pratensis, *Bechst.* **Landrail.**

Local Names.—Corn-craig, Corn-scrack, Corn-scraich.

In 1847 Hepburn remarks that the Landrail was found about Glen Urquhart, and it is common there now (A. Craig). The species occurs in most of the districts from whence we have notes, in greater or less abundance, but from our own observation does not seem to be so numerous as might be expected from the amount of cultivated area. We have shot them on the heather at Balnacoil, in Sutherland, and also at Kintradwell, when hunting the brackens and whins for rabbits.

The *O.S.A.* gives as a locality Kirkhill (North-west Moray), vol. iv. p. 114. Edward says:—'Very sparingly distributed about Banff.' He has seen it as late as December. It has a place in Smith's list, and is common about Huntly (Dr. J. O. W.).

The Corn-crake occurs far up the Carn district hills amongst patches of cultivation, but of course in such localities only in comparative numbers—numbers very limited as compared with more fully cultivated areas.

In 1885 we heard it for the first time that season at Aberlour on Spey, on 10th May. So long ago as 1844 Dr. Gordon recorded its arrival near Elgin on the 9th May, and in the same year it was reported as very abundant about Forres, and as leaving in September. Considerable numbers are killed at times by coming in contact with the telegraph-wires.

By several credible observers it is stated that Corn-crakes vary very considerably in numbers year by year, and are not so numerous as on the west coast.

The species is said by some people to be scarcer now than formerly; but such an estimate may be considered, we think, from the standpoint of the last sentence—not a permanent decrease, only a seasonal variation—a 'Corn-crake year'!—like a good or bad 'Woodcock year.'

In those birds killed by telegraph-wires—some of which we have examined in Brown of Forres' shop—it seems almost invariably the case that the upper mandible, close to the head, is severely bruised.

Porzana maruetta (*Leach*). Spotted Crake.

A very rare species in the north of our area. Besides the one mentioned as having been taken at Rosehall (vide *Fauna of Sutherland and Caithness*), we have only notes of other three examples; one of these was obtained at Ardross, on October 7th, 1889, and another close to Inverness, on the 14th of the same month and year. The third was shot in the Carse of Clachnaharry, near Inverness, on the 2nd December 1874, by Mr. T. B. Snowie of Inverness.

St. John has killed it at Spynie, and always in autumn or winter; he considered it to be 'very rare.'

Dr. J. O. Wilson notes it, and says:—'Rare: there is one in the possession of Col. Simpson (of Huntly). It was killed near Cobairdy many years ago. Cobairdy lies at the back of the hill above Corniehaugh, to the east or south-east of Corniehaugh, on the river Deveron. Sim adds the rider to the above as follows. He says:—'Many years ago' (September 1875), 'the bird was sent to me.'

One was killed at the loch of Spynie, *in the summer* of 1843, by Alexander Robertson, Esq. of Woodside. Norman mentions it as having bred (*Zoologist*), but he probably referred to the last-mentioned item; beyond this, we are not aware of any record of its nesting.

Porzana parva (*Scop.*). Little Crake.

Edward says:—'Only one procured. It occurred at a place called Thornton, on the banks of the Isla.' This bird was bought by Professor Newton, for Mr. J. H. Gurney, from Edward, and the sternum is in the Cambridge Museum (A. N., *in lit.* 25/ii/92).

Professor Newton has kindly placed at our disposal the original record of this rarity by Edward:—'The bird was handed to me by Mr. John Murray, Whitehills. It was found dead in a plantation on the banks of the Isla, at Thornton, in the parish of Grange, by a young person tending cattle there, on the 12th March 1852.' Edward says it is the first that ever came under his observation.

Rallus aquaticus, *L.* Water-Rail.

The Water-rail does not seem to be a very common species north of Inverness, though it is no doubt more abundant than would appear at first. At the best of times it is a very inconspicuous bird, and a hasty glance as it moves along the side of a burn would lead the ordinary observer to fancy he had just seen a water-rat. We have shot it among the grass and hummocks that edge the shore of the Beauly Firth, near Lentran, as also in Sutherlandshire.

A note was given us of three of these birds that arrived on May 10th at a loch in the Invergarry forest, but they may have been Water-hens. The writer notes that they could 'only be seen with difficulty. They probably breed here, but spend most of their time in the woods. Their cry is not as loud as the Landrail's; they always cry when hidden, never in the open.'

At Tain, Mr. Jennings mentions, they are found in the winter.

St. John mentions Loch Spynie as the only place in which he had found this bird breeding, and no other person has as yet added to this locality, to our knowledge, in all our present large area.

Mr. Hoy records 'one shot at Gordon Castle by the Duke on January 17th, 1814. Another one, which had perched upon a tree, was also obtained by the Duke on December 22nd, 1817.'

Edward considered it 'almost a rarity,' and certainly it does not appear to have been frequently observed at the dates of our later records.

Dr. J. O. Wilson speaks of it as 'rare.' He caught one 'near the old mineral well at the old Castle of Huntly, and Mr. Gray, junior, of Waterton, Drumblade, informed Dr. Wilson that he had seen the Water-rail on the burn there 'frequently,' but added, 'they are very shy.'

But Mr. George Sim, Aberdeen, warns us in a way that often only a local man can. He says:—'The Water-hen is often called the Water-rail, and I suspect the "frequently" of Mr. Gray, junior, may refer to *Gallinula chloropus.* Certainly, even with one having a very large experience, few men can say, in this country, that they have seen Water-rails (*vera*) "frequently."' Yet the Water-rail is *not* a rare bird really, and the rarity of opportunities of seeing and catching it are more to be credited to its habits than its scarcity. We have ourselves caught, shot, or captured, by the aid of a Clumber spaniel—trained to snipe—from four to six of these birds in a season.

We incline to the belief that, as in many other parts of Scotland, the Water-rail is really a common bird in our present area, certainly during migration; and far from uncommon even in the breeding season. Dr. Gordon says:—'Not infrequent along the sides of rocks and rivers, but from its shy habits rarely seen (*Fauna of Moray*). Brown of Forres calls it common in his neighbourhood. In the Newcastle Museum there are several eggs taken on Loch Spynie, between 1852 and 1857 (*auct.* Richard Howse, Curator, *in lit.* 20th May 1892), which are referred to in Hancock's notes.

If we look at its retiring habits, its positive breeding records—say thirty to forty years ago,—and others of much later date in other parts of Scotland, the probability seems certainly in favour of its much more general breeding distribution in Scotland than has been as yet actually recorded. In severe winters 'freezing out' enables observers to find more Water-rails, *et id genus*, than in an open winter.

Gallinula chloropus (*L.*). **Moorhen.** Popularly called also 'Water-rail' (George Sim).

North of the Ness this half-tame, half-wild species is common and resident, very generally distributed when not interfered with. In 1847 Hepburn met with it in Glen Urquhart Bay, though it was then scarce. From this and from our own observations we think the bird has increased in numbers since then in the North.

The Moorhen is found on lochs suitable to it, far away among the hills, and again close to towns like Inverness, where there is sufficient cover to hide it and its nest. We have also seen them among the short grass that grows on the ooze along the Beauly Firth.

Southwards it is common and resident. It is included in all lists, and represented in most Museums. We have seen it on all the reaches of Deveron, except very high up among the Carn district burns. [We have fished from sources of the Deveron nearly to the sea, except about the last twelve miles.] The Moorhen, however, though less common high up in the Carn district, is seen nevertheless even upon the high lochs near the bases of the Cairngorms. Hinxman has found a few pairs scattered along the course of the river Avon. It is abundant along Spey and in Abernethy, and is exceedingly tame and abundant on Speyside, especially around Gordon Castle.

Fulica atra, *L.* **Coot.**

In 1847 Hepburn noticed the Coot in Glen Urquhart Bay, and then only; they are now quite common there. Mr. Jennings says they breed largely near Fearn, in East Ross-shire. They occur also near Guisachan and Invergarry, though, perhaps, not very abundantly. We have met them in many parts of our area from Sutherlandshire southwards, though on the hill lochs, from the general want of cover in these places, they are less commonly seen.

Edward seemed to consider it as only an 'occasional visitant.' Certainly it is not so universally distributed as the Moorhen. Dr. J. O. Wilson says it is never seen near Huntly, but abounds on Loch Park (Drummuir) near Keith. He very neatly describes these three birds thus:—'The Coot is a loch-bird; the Moorhen is a small river or back-water bird; the Water-rail is a ditch or very small burn bird.' Hinxman found it breeding plentifully on the lochs and lochans of the Abernethy forests, and it occurs plentifully at Loch Spynie and at Loch Moy. At sea it is shot at times near Covesea and elsewhere. One shot at Covesea is in the Elgin Museum. It occurs, indeed, on most of the fresh-water lochs of Spey and surrounding districts, which contain suitable harbourage. We could not, however, detect any upon Lochandorb—a loch singularly devoid of feeding for aquatic birds, nor, as might be expected, do the high Highland lochs, such as Loch Errochd, provide shelter for them.

A pure white Coot was shot at Kilravock, on May 8th, 1884.

[*Obs.—Porphyrio cœruleus* (Vand.). Purple Gallinule.—There is at present a specimen in the Forres Museum, which was brought to Brown of Forres in an *undomesticated state* some years ago. Professor Newton refused to accept of it as otherwise than an escape, though Dr. Gordon, who asked him, entertained a different opinion. It was obtained near Forres.[1] We must also, however, include it only in brackets.]

Family **GRUIDÆ.**

Grus communis, *Bechst.* Common Crane.

On November 6th, 1875, four of these birds were seen at Inverernie, on the banks of the Nairn, and two were shot on the 8th of that month. The others remained until the 11th, when they left apparently for the west (R. S. Hills, in *Field*, 4/xii 75). We saw the birds in Macleay's shop, and they passed into the possession of —— Smithson, Esq. of Lentran.

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[1] We think it a pity that lairds and others, who introduce and acclimatise foreign ornamental waterfowl, do not make public, in the interests of naturalists, the numbers and species so introduced, and give notice of escapes. If such a plan were universally adopted much confusion would be avoided, and the labours of the recording naturalists be lightened, and such a system could scarcely fail to recommend itself also to the owners of natural or artificial duck-lochs or ponds.

Family **OTIDIDÆ.**

Otis tarda, *L.* Great Bustard.

If we go back to ancient history we find sufficient evidence in the writings of Hector Boece to warrant the Great Bustard being included in the Fauna of Scotland. Thus says that author, writing in 1527:—'And beside thir thre uncouth kind of fowlis (previously spoken of, viz.:—Capercailye, mure cokis and black cokis) is ane uthir kind of fowlis in the Mers, mair uncouth, namit gustardis, als meikle as ane swan; bot in the colour of thair fedderis, and gust of thair flesche, thay ar litil different fra ane pertrik. Thir last fowlis ar not frequent, bot in few noumer; and sa far haitis the cumpany of man, that gif thay find thair eggis aindit (*i.e.* breathed upon) or twichit be men, thay leif thaim, and layis eggis in ane othir place. Thay lay their eggis in the bair erd' (*Scotland before* 1700, p. 84).

The account by Bishop Leslie is merely a repetition of Hector Boece, and dates some fifty years later, viz. 1578 (*loc. cit.* p. 139, *q.v.*). The above remarks refer really to other parts of Scotland than the strict limits of our present area.

'One was shot in 1803 in Murrayshire by William Young, Esq. of Borough Head' (Fleming's *British Animals*).

Otis tetrax, *L.* Little Bustard.

Gray, referring to this species in Scotland, says (*Birds of the West of Scotland*, p. 249):—

'A third—a female—was obtained in Morayshire on 8th February 1861: it was shot at Westfield, about four or five miles from Elgin, and when first seen was, along with a flock of Wood Pigeons, in a turnip-field picking the tops of the plants. This bird, which is a very fine specimen, now belongs to the collection of the Elgin Museum, where we have seen and examined it. A fourth Little Bustard was seen in the same county a few days after the last-mentioned bird was killed. It was observed on three or four different occasions, but was so shy that it would not admit of a nearer approach than 200 yards.'

Family CHARADRIIDÆ.

Charadrius morinellus (*L.*). Dotterel.

The Dotterel had been frequently spoken of by our earlier authors on British Ornithology as commonly seen during the migration seasons at certain favourite resting-places upon the east coast of Scotland and England, but Pennant appears to have known nothing of its occurrence in Scotland, as he only refers to English localities in his *British Zoology* (1778), and says nothing about it in *The Caledonian Zoology* (1777).

Colonel Thornton, however, met with them on the Grampians in pairs, and conveyed the information to Montagu (*fide* Fleming, 1828), but Montagu in the 1833 edition speaks of his having himself 'met with pairs on the mountains of Scotland, sufficiently late for breeding' (Rennie's edition of *Orn. Dictionary*, 1833).

There is no mention of the Dotterel within our area in the old *Statistical Account* (1791), but that useful old work has notices of it close to the boundaries both in Dee, near Alford (vol. ix. p. 108), and in Forfar, at Carmylie (vol. i. p. 437), and speaks of it as a bird of passage. Selby only follows the earlier quotations, but though he shot a Dotterel, 'apparently a bird of the year,' upon one occasion, and quotes Colonel Thornton as also having obtained a bird on the 16th August (see *Sporting Tour*), he does not seem to favour the idea entertained by Fleming and Montagu, that they were Scots-bred birds. Even MacGillivray does not speak of them as positively nesting amongst the hills of his native country, and quotes at length 'the only good account' of its nesting, 'derived from the author's own observation,' from the pen of Mr. T. C. Heysham, in the *Mag. of Nat. Hist.* (vol. ii. p. 295). Yarrell (2nd edition, vol. ii. p. 462) says he had an egg taken on the Grampian Hills, and very accurately describes it, but only quotes our previous authorities. In the latest edition of Yarrell (Saunders, 1884), reference is made to the finding of the nest and eggs, within the boundaries of Moray, by Feilden and Harvie-Brown, referring to the account published in the *Pr. N. H. Soc. Glasgow*, ii. pp. 237-241. This account we think it well to quote fully here as distinctly belonging to our faunal area, and, with the exception of Selby's single egg, as being the first authenticated and carefully identified Scottish nest of eggs. This must be our excuse for quoting at length.

'Some years ago my friend Captain H. W. Feilden and myself obtained the kind permission of the lessee of a shooting, in a certain wild district of Scotland, to obtain the eggs of the Dotterel (*Charadrius morinellus*), which rare species was known to breed upon a mountain on the property. The gamekeeper, however, during three successive seasons, failed to obtain them for us, and assured us that none had frequented their accustomed haunts during these years; further, that a young English gentleman, who was shooting there, had killed in one day the two old birds and the three young; and that, since that time, none had been seen upon the mountain, though, upon an adjoining property, two pairs had bred undisturbed the year previous to our visit.

'It was, therefore, with but the very faintest expectations of success that Captain Feilden and myself, accompanied by the gamekeeper, started to ascend the mountain on the morning of the 16th June of the present year (1873). Indeed, we already consoled ourselves with the thought that we would, at all events, see the ground which was known at one time to have been occupied by this now rare British bird, and have a good walk and a view from the top. We reached the top of the mountain, some 3000 feet above the sea, at nine o'clock A.M., and found a broad, almost level, moss-covered plateau stretching before us to a distance of about three-quarters of a mile. Scattered over this level mossy ground were numberless small pieces of grey rock, partially imbedded in the yielding moss, and the moss itself rose in ridges or hummocks, giving an irregular outline to the surface, or, as it were, forming the latter into innumerable miniature hills and valleys. We at once saw how admirably suited to the habits of the species we were in search of this kind of ground was, and, moreover, that we would have no little difficulty to contend with, in the event of our having to watch the bird to the nest, as the upper plumage of the Dotterel harmonises in colour with the yellowish-brown carpeting of moss. First, however, we had to find the birds; and, accordingly, with this object in view, we slowly walked over the deep yielding moss, towards the far, or west end of the ridge.

'About half-past ten o'clock, as we were walking along in line, I first discovered a Dotterel, running swiftly, about twenty yards in front of the gamekeeper. It shortly afterwards rose and flew close past, and across our line of march, uttering a low, plaintive, plover-like call—once heard, not easily to be forgotten. Feilden and I agreed that it was the female bird, from the brightness of the chestnut colouring, which was distinctly visible as it passed us.[1] We now marked the place where I had first seen it, by laying one small grey stone on the top of a larger, and after a short search for the other bird, in which we were not successful, we went away again to the east end of the range. After an hour or so we returned again to the west end, Feilden walking in the centre, and the keeper and myself on either side, lower down the hill and a little in advance. On arriving near the place, Feilden detected the female running a considerable way off in front of him, and I saw the male bird, which ran from the vicinity of the nest, or at least from where we supposed it to be, in a diametrically opposite direction from that chosen by the female. We now made sure that the eggs or young were not far distant; while, at the same time, we learned that we had two most cunning parents to circumvent. Far, indeed, were they from being the "little fools" (*morinelli*), which Linnæus named them.

'After a consultation, it was agreed to leave me to watch, whilst Feilden and the keeper again went off to a distance. Accordingly, I lay down, partially concealed by a hummocky piece of mossy ground, about fifty yards from the place whence Feilden had seen the female run. The keeper afterwards told me that I was absolutely invisible from a distance, the colour of my clothes harmonising admirably with that of the yellowish-brown moss. For an hour I remained almost, if not quite, immovable, and, at the end of that time, was rewarded by seeing the female run rapidly up over the crest of the nearest ridge. It became a difficult matter to watch her movements after she came down amongst the hummocky ground, all the more so, as she took advantage of every grey stone or inequality of the ground to dodge behind, and stooping low, with head pushed out in front, when she crossed the higher places, just as I have seen a Corncrake do when crossing open ground between two places of shelter. She must have seen me, or suspected my presence, as she soon ran rapidly away in another direction, over the sky-line, and was lost to view. I waited again, and in about ten minutes she returned from the same direction in which she had last disappeared, and repeated the manœuvres above described, also picking up flies, and endeavouring to put on an appearance of supreme indifference. As if not quite certain of my presence, she sometimes perched on the top of a mossy hummock and looked round, jerking up her head; but, finally, she again ran swiftly over the sky-line. From these movements I, somewhat too hastily, concluded that the nest must have been in that direction, and I accordingly left my place of concealment, and carefully stalked, on hands and knees, after her. I peeped over the crest just to see her take wing from the succeeding sky-line.

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[1] 'The females of several species of Waders are brighter in colour than the males. The Dotterel and Red-necked Phalarope are perhaps the most striking instances of this amongst British birds.'

'Feilden and the keeper then joined me, and we searched carefully around, beating up every foot of a large square which we had first marked out. We found a *false nest*, which gave us hopes. Had the real nest been within that square, we feel convinced it could not have escaped us, and the sequel will show how closely we must have passed it. Once more we went to the east end of the range. Here, amongst some loose stones on the side of the hill, we found a Ptarmigan sitting on her nest. Feilden put down his hand, and the poor bird did not move off her eggs until his forefinger was within three inches of her bill. When at last she scuttled off, we found that she had been sitting hard on only three eggs.

'After an hour or so, Feilden started, this time alone, and we lay still. In about half an hour from the time he left us we heard him shout, and we sprang to our feet and ran. The keeper said, "Can he have found it?" and I answered, as we ran, "Not a doubt of it." Sure enough, Feilden had the nest safely and surely marked with a red pocket-handkerchief, and had come away to meet us. As we now approached we again saw the bird run, this time directly off the nest. It was not fifteen yards from the side of the big square we had before so carefully searched. We sat down beside the nest and feasted our eyes upon the contents; and the poor bird, still exercising her cunning, ran round and round us, here and there picking at the flies, or pretending to do so, or watching us from a hummock of moss.

'There were the three eggs, lying in a shallow saucer-like depression in the deep moss, close to a small grey stone, behind which Feilden had seen her lie down. There was no lining to the nest whatever; it was simply a shallow hollow, *pressed down* (not scraped) by the bird, and the eggs lay points inwards.

'Feilden had seen the bird run from the nest, or from its vicinity, and had remained and watched. At my suggestion he had come up over the crest of the ridge instead of going down from the top. The bird came running from one direction, and then, as she had done when I watched, ran down the hill in another. The second time, she came from a different direction, repeating the manœuvres I have endeavoured to describe; but the third time, Feilden marked her sneak on to the nest, head down, and saw her gradually settle. He gave her five minutes, to make certain, and then walked straight for the little grey stone, keeping his eyes firmly fixed upon it. When he was within six feet of the bird she was still indistinguishable from the surrounding moss, and it was only when she was at last forced to rise that he discovered her. It was six o'clock when the nest was discovered, and seven o'clock when we left the mountain. Feilden carefully packed the eggs in his hat, which he carried in his hand, and I brought away a square of the moss containing the nest, having cut it carefully out with my knife.

'I heard the Dotterel's cry, well and repeatedly, to-day, and recognised it as the same that I had heard the day previously on another mountain, which I now feel convinced holds another pair.

'I have, in this paper, confined myself to giving a statement of the day's proceedings and search for the eggs, which I have now the pleasure of exhibiting to the Society; and I have dwelt at considerable length on the habits of the bird, as observed by us. I would have had some hesitation in taking up so much of your time in this way, had the nesting habits of this rare bird been as generally known as those of others of our rarer species; but when I state that no published account of its nesting habits in Great Britain has appeared since 1835, I hope you will kindly overlook the length of my remarks. I might easily add to the paper, by giving a short sketch of the present distribution of the Dotterel in Scotland, together with some account of the autumn migration and shooting of the birds in certain districts in the south of Scotland and north of England, from persons who have witnessed the flight and participated in the slaughter, but I have already exceeded the space originally intended. I will not, therefore, trespass further on your time, except to say that my friend Captain Feilden has written an account of our search for Mr. H. E. Dresser's *Birds of Europe*, which will, doubtless, appear in due time. To those who are sufficiently interested in the subject of these remarks, I may recommend, also, a perusal of the account, written in 1835 by Mr. Heysham, and published in the *Magazine of Natural History* (vol. ii. p. 295), of the habits of this species, as observed by him amongst the Cumberland hills; or of Macgillivray's *British Birds* (vol. iv. p. 108 *et seq.*), where the same account is partially reproduced.'

Since that date many nests have been obtained, and ornithologists realise that the bird has long been considered much rarer than it really was. True, a great difference in the numbers observed at favourite resting-places, at the seasons of migration in many instances—both locally and generally—caused that belief; and we think that if any great diminution of numbers took place, it was principally caused by local gunners, at these times and seasons and places, and not by any great disturbance of the species at its high-level breeding haunts.

To us there appears to be no really clear evidence of any very serious diminution of their numbers; and, in opposition to the general outcry, we have the estimate from one of our ablest naturalists—Mr. William Evans—of the numbers of breeding pairs—in a very limited area of the Cairngorms, at ten pairs—as observed principally by himself in 1892, and this notwithstanding repeated and systematic raids perpetrated upon them, principally by English collectors, who often in their own country pose as 'protectionists,' but, with radical twist of conscience, preach plunder across the border as perfectly legitimate, and sneer at the rights of property over a 'mountain in Scotland' or a 'barren island of the Hebrides'!

We have abundance of notes and evidence which would enable us to lay down very exact distribution of the Dotterel during the nesting season in Scotland, but to naturalists we believe we have said enough, by indicating the distribution during migration. Suffice it to say, the Dotterel still breeds over an altitude of about 2700 to 3000 feet among the Cairngorm and Grampian ranges, and still occupies a few localities to the north of the valley of the Spey. One correspondent[1] writes:—'At one time—say thirty years ago (1864)—they were comparatively common in the 'localities indicated' (*i.e.* north of the Spey valley). 'Of recent years they have only appeared in limited numbers, and this is true as regards all our mountain heights'—*i.e.* as well as those specified in his communication. We ourselves have no positive records of its breeding farther west than Ben Alder—even if it does breed regularly on that hill. North of the Spey valley a few hills are suitable, as they top the 3000 feet contours. We have a decided record from one capable observer of no less than five pairs of Dotterel, evidently with eggs or young, having been seen upon one mountain of the Cairngorm range in 1885.

The comparatively restricted area in which this species breeds is not easily explained. The moss on the summits of these mountains amongst which, or *on* which, the eggs of the Dotterel are laid, is the woolly-fringed moss (*Trichostomum lanigerosum*) of botanists, but this moss occurs on many other mountains which appear equally suited to their wants, above an altitude of about 2700 feet, the birds themselves, however, being seldom found below the altitude of 3000 feet.

The Dotterels would appear to approach their breeding haunts, in Forfarshire, and south of Dee, by the foot-hills of the Clova range, but those of the northern Cairngorms by a somewhat more northerly route. Thus we have records of resting-places in Dee in Buchan, and within our own area towards the mouth of the river Deveron, and on the higher ridges which separate the valley of the Deveron from the streams running east through Aberdeenshire.

St. John says the Dotterel is a rare visitor, but may occasionally be found, both in August and again in April, on their way to and from their breeding-grounds.

Major Chadwick includes it in his list of birds seen on the Culbin Sands, but this we consider must be of very exceptional occurrence. Brown of Forres, however, corroborates the statement, and has seen a few shot in September near Forres, and O. A. J. Lee saw two pairs near that place on August 5th, 1887—an early date at which to find them at such a low elevation.

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[1] Nether Lochaber: the *nom-de-plume* of the Rev. Alexander Stewart.

We need scarcely point out that these Findhorn or Culbin Sands records indicate a different breeding quarter from the occurrences farther inland to the east. It is also frequently killed in Strathdearn and Badenoch by sportsmen.

Mr. J. G. Phillip records it from the hills around Glen Livet, but as rare, and Hinxman finds it in small parties on the moors near Tomintoul in October.

Specimens of the Dotterel were sent to Macleay from Carr Bridge in 1851. Mr. Backhouse informs us he saw five in one day on one of the hills on the watershed of our area, in 1885. Mr. W. Evans met with the Dotterel several times in small parties on the Cairngorms, but never under 3000 feet. No less than fourteen were seen together on one occasion.

Of its distribution in the breeding season north of Spey, we have still to obtain data of more reliable character, but we believe there is every reason to credit at least one locality.

Although both parent birds of the nest whence Colonel Feilden and Harvie-Brown took the eggs in 1873 were shot in a subsequent season, and sent, with the eggs, to the late Dr. Dewar of Glasgow, we are glad to be able to say that the species is not yet extinct there. A pair bred in 1892, and again in 1893, in both of which years the eggs were taken, and in 1892—sad to relate—again both birds were shot, and, along with the eggs, are in the collection of an English gentleman who, owing to illness, had failed to obtain them the year before. We are glad to say the old birds were not molested in 1893.

Mr. Chisholm writes us from Foyers that the Dotterel undoubtedly nests on the Monadhliath, and is well known to the keepers in that district. Mr. Chisholm gives the Gaelic name as *An damatan moulich*—or 'the fool of the moss,' and says he never met with them except on the very highest tops; the birds would often allow his dogs to approach within five yards of them before moving. The same person also remarks that the Dotterel is very useful to the keepers watching at the fox-dens in the high hills in the late evening and early morning. If the old dog or vixen fox is moving about, the Dotterel will very soon detect him, and fly from one hillock to another, whistling low; as the fox comes nearer the whistling becomes louder, and it is time for the watcher to be ready.

Ægialitis hiaticula (*L.*). Ringed Plover.

Local Names.—Sanny (Sandy), Laverock (Lark), Sandie-porpie.

Although extremely abundant along the coast-line where suitable, we have, so far, few inland localities for this species north of the Ness: it is, however, common at the very inland locality of Badenloch, Sutherlandshire. Mr. Muirhead found it breeding on the shores of Loch Ness in 1867; but we did not observe it on Loch Garry, where there are some beaches well adapted to its habits.

The *O.S.A.* is silent, unless the name 'Plover-half' refers to this species in Rothiemurchus and Duthil (*O.S.A.*, vol. iv. p. 114). Edward says:—'Breeds on the shore, and also forty miles inland,' which we have ascertained to be quite correct.

The species is not abundant in the eastern parts of our area, or at least not so generally distributed as on the watersheds of Spey and westward. At inland localities it is local and not very abundant. A pair or two may be found here and there along the big rivers and on suitable patches of gravelly ground, even far up the valleys of the Carn districts. All along the sandy coasts of the Moray Firth it is abundant, as also among the wave-like ridges of pebbles, among the Sand-Grouse-haunted barrens of Findhorn and Culbin, and the Tern-ground of the same—bare, stony, and gravelly flats between the sandhills. Far up near the sources of Spey and its tributaries, close to the great 'divide' between Tay and Spey, the Ringed Plover successfully rears its young, varying in numbers with the seasons, appearing in new localities one year, and deserting old ones.

Considerable numbers were found breeding on the sandy shores of Loch Morlich, on the channel of the Spey, near the Doune, and on the Dulnan about four miles above Carr Bridge, by Hinxman.

Charadrius pluvialis, *L.* Golden Plover.

From our own experience this is a by no means abundant species in the northern parts of our area during the breeding season, except in Sutherlandshire. In many parts we should say it was decidedly uncommon. During our rambles on the hills near Guisachan we never met with it, and it is rare at Invergarry. It is, however, widely distributed, and appears in all our local lists. In hard weather large flocks frequent the shore, and also certain fields, but in the latter case only very locally.

Records in the *O.S.A.* are a little vague, but may generally be accepted. Localities given are Cabrach (U. D), Grange (L. D.), Kirkhill (N.W. Moray), Rothiemurchus, and Duthil (Spey), and it is included in most local lists either as breeding or passing down to the shores in stormy weather to the feeding-grounds.

Though not very abundant, the species is generally distributed throughout the areas suitable to their habits. A few were observed to be nesting pretty low down on Dunbennan Hill, near Huntly, and a nest was found by ourselves there in 1889. Dr. J. O. Wilson, however, whose local knowledge is exact, speaks of it as abundant on the hills of Middle Deveron.

Hinxman found Golden Plovers in flocks at Nethy on May 18th (1891), but this was immediately after the severe snow-storm of the 17th, which was universal all over the country north of the Grampians. At Rothiemay the snow stuck on the sides of the chimneys, with a heavy drift, to the depth of six inches.

A Mr. Bill, who is still alive, told Captain Dunbar-Brander that on one occasion he had a shot at Golden Plover sitting on a large slab of ice, and that he got 146 birds at one discharge. There were some hundreds of birds, and 'every pellet would tell perhaps two or three times' (Captain Dunbar-Brander, *in lit.* March 1892).

Squatarola helvetica (*L.*). Grey Plover.

A very rare bird north of the Ness, from our own and others' observations. Even on the Dornoch Firth, which seems so suited to its requirements, Mr. Jennings says it is an uncommon winter visitant.

O. A. J. Lee maintains having seen a pair among a large flock of Golden Plovers on August 24th, 1887.

Edward says, 'Rather rare.' It was noticed by Foljambe in 1844, but St. John passes it over in silence. Brown records it as 'common, but not abundant,' in 1885. Specimens occur in Banff Museum, and it is included in Smith's lists; but Mr. George Sim places its value in the *Fauna* more fully, thus:—'It is not common; yet cannot by any means be called rare. It occurs all along the north-east coast of Aberdeen in autumn, in too great numbers to warrant the records of single or individual instances.' Of course Mr. George Sim's remarks strictly relate to 'Dee,' but we quote them as useful sidelights from a migrational standpoint.

Vanellus vulgaris, *Bechst.* **Lapwing.**

Local Names.—Teuchet, Wallop, Peeweet, Wallack, Wallochie-weet, Peesie, Peesweep.

Early in the century the Lapwing was a comparatively rare bird in the north of our present area, and usually only a summer visitor. About fifty years ago a few remained through the winter, and now it is not by any means uncommon at that season of the year, though the great bulk of the vast flocks that haunt the head of the Beauly Firth in the early autumn leaves for the south towards the end of October.

We have notes of the Lapwing from the whole of our area, though, of course, varying in numbers according as the ground is suited or not to its requirements. They are numerous at Invergarry, but rare at Guisachan. We saw one pair in the wilds of Glen Affric. At Tain they are very common from March to October (Jennings), and are abundant all the way up to the Ord, but less so in winter.

The *O.S.A.* says little, but gives Kirkhill (North-west Moray), and Kirkmichael (Glenavon), as localities. Dr. J. O. Wilson says it is abundant in Deveron valley; and all local lists include it, usually as common. Our own experience teaches us that it is common all down the valleys from high up among summits of the Carn districts and valleys, all through the haughs and cultivated slopes, to the dry-field acres along the coasts. They are not, however, to be compared in numbers with those in many other parts of Scotland, such, for instance, as the island of Tiree (vide *Fauna of Argyll*, p. 166). The eggs all over Moray, even far up near the sources of the rivers, are systematically taken to supply the London market, and the Lapwing is spoken of all over our area as decidedly scarcer than formerly. We know that about a hundred and forty dozens of their eggs passed through the hands of one middleman in one small town in Banffshire before the 15th April 1893. A favourite ground of the Lapwing is the central moor of Rothiemurchus, where the great acreage of pine was cut in order to supply sleepers for the Highland Railway in 1864. We saw them there in abundance in June 1891.

Lapwings are seen even in midwinter, but the bulk migrate, and the successive steps of their departure in common with other species is decidedly interesting to study. Thus: Lapwings are seen at their breeding haunts, or upon closely adjoining pastures, after the young are hatched off and able to fly, in small companies of a dozen or two, or more, according to the breeding population, and often amounting to considerable flocks. Later they move on, this company gaining accessions as they pass along, often flying high and taking longer flights, as if prospecting ahead, or practising the young muscles of the wings. At last, still later, and still following down the valleys—like many other species—they accumulate near the mouths of the rivers on the flats or carse-lands near the sea, and thus probably represent the whole Lapwing population of each river-system.

We wish that London could be more easily appeased, and that Rooks' eggs could be substituted for those of the Lapwing oftener than they are; this could easily be done by removing the shells. Some which we ourselves saw in the original building of a Club in Edinburgh had not been so treated! The then steward, when the fact was pointed out to him, vied in tint with the eggs themselves!

Strepsilas interpres (*L.*). Turnstone.

Perhaps more abundant about the shores of East Sutherland than elsewhere in our area. Here at times they are to be met with in considerable numbers, and towards the middle or end of May the few that are then left are in magnificent breeding plumage.

Lower down the coast numerous records occur of its presence; but we do not find it spoken of as being very numerous, except by Brown of Forres, who says it is 'abundant, arriving on the coasts in October, and remaining till May.' The rockier portions of the coast between Covesea and Hopeman or Burghead offer the most likely ground, but numbers also frequent the opener reaches of sandy coast by Nairn, the Culbin Sands, and Bay of Burghead.

Hæmatopus ostralegus, *L.* Oyster-catcher.

Local Names.—Sea Pyot, Krocket.

It is somewhat curious to find that this well-recognised bird should have its name omitted from even the fullest lists of the *O.S.A.* of the parishes of the Moray Basin. Such a prominent species as it *now* is on both coast and river would almost lead one to suppose that if negative evidence is of value at all, it must have been *absent* or very much rarer on the rivers one hundred years ago. It could scarcely have escaped observation even then, if at all common, and it possesses a local name; but there is plenty of other evidence of its occurrence in our earlier records.

The species is common all along the Sutherland coast, occurring at times on Loch Shin, and has been seen by us up the Cassley strath on one occasion. The Oyster-catcher comes up the Beauly to Erchless (Macleay), and also up the Conon (Captain Stirling). As early as 1867 this species was observed on the side of Loch Ness by Mr. G. Muirhead on the 25th of May, and it breeds on the river Ness not far from Inverness. In 1892 we saw a bird that had been shot at the head of Loch Garry, where it breeds, but we have good reason for believing this is a recent extension of range. We observed a few pairs at one or two localities along Loch Ness in June and July 1895.

Edward and Smith both speak of it as common and breeding, but as not abundant in winter. Edward says:—'Now and then it may be seen during winter, but large flocks generally in September for a day, and then pass farther south.' It is certain that Oyster-catchers have bred for many years at inland localities, as Dr. Gordon records their arrival in March 1844 at Lossiemouth, and inland, where they still breed in the open fields around the loch of Spynie. They usually arrive in April, sometimes as early as the 12th March, though this is dependent on the season.

At the present time Oyster-catchers penetrate almost to the highest parts of the river-systems, close under the Cairngorms, far up the Spey into Badenoch and Lochaber, and the sources of the Nairn and Findhorn, wherever gravelly soil or gravel-beds occur in the fields or in the courses of the streams. They have even been known to appear on Loch Errochd at the east or north-east end, and, as is well known, they breed close to the watershed of Truim and Garry (Tay). It is needless to multiply illustrations of their almost universal distribution. Suffice it to say, further, we have ourselves met with them in the nesting season in all of the places already named, and at the upper waters of nearly every suitable stream, such as the Deveron, Fiddich, Livet, Avon, Findhorn, and tributaries; but we do not find it so common by loch-sides as by river-sides, and it is entirely absent from the cold, inhospitable shores of Lochandorb, and the warmer, shaded lochs like Loch Moy, Loch Spynie, or Lochnabo, and among those of the wooded tracts of Spey. Oyster-catchers usually arrive upon the Spey about the first week in April.

At the end of summer Oyster-catchers collect in family parties on the gravel-beds or adjoining haugh-lands, even resting at times upon the grassy slopes of the hills: then, in parties of a dozen, becoming more noisy and restless, flying higher, and taking longer flights. Finally, the whole Sea-pyet population of each valley gathers in scores, and perhaps hundreds, near the estuaries, and these again combine and repair to favourite mussel-scalps and feeding-grounds, remaining thus in hundreds, and even thousands, for mutual company and protection throughout the winter months. The Oyster-catcher is a noisy, 'pedantic-looking old gentleman'—as we have heard him described—'with a white waistcoat, tail-coat, and very red nose, and red gouty feet, but a gentlemanly bird withal.'[1]

So much for the autumn migration of the Oyster-catcher. Now, in 1895 we had a favourable opportunity of witnessing the arrival of the same species at its nesting quarters in another portion of our area.

At Drachlaw Farm, near Turriff, on the river Deveron, upon the 16th April, a single bird was seen flying north at an elevation of at least 2000 feet, crying loudly and continuously. We watched it for about two miles, judging our distances by known landmarks. It disappeared, maintaining the same lofty elevation. Then, on the following day, five were observed, also flying north at about the same height above the valley. Two separated from the others when the party was almost directly over Drachlaw Haugh, and suddenly, crying once or twice—all had been perfectly silent before—descended spirally with a curious 'cork-screw flight,' if we may so express it, and alighted together in a short grass field across the river, about two hundred yards from our post of observation. For a few seconds—or say half a minute—they preened their feathers and then lay down, bellies close to the ground, and there they slept the better part of the forenoon.

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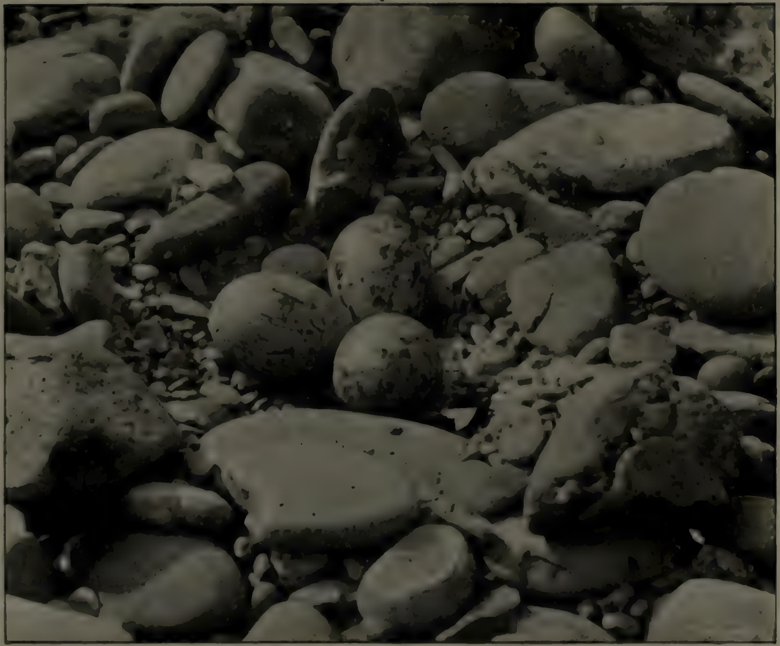
[1] The original description is from the pen of our friend Dr. J. O. Wilson, and is somewhat shorter than the above.



OYSTER-CATCHER'S NEST.

This was evidently their first arrival at this place. The other three, which had travelled so far in their company, continued their onward flight towards the north. The rest of their history up to the time of their third egg being laid is as follows, as carefully ascertained by a young collecting friend, Master J. Cook, and myself:—

These two Oyster-catchers *arrived* 17th April, and slept most of the forenoon; *rested*, *fed*, 18th, 19th, or longer (?); made nest between say 20th and 24th; laid three eggs, 24th, 25th, 26th; began incubation, 27th; continued, 28th and 29th, *when the eggs were taken*, one of which was, to all appearances and careful observation, perfectly fresh-laid.

The only additional remark we desire to make is that this is an early nest as compared with many we have ourselves found, especially on the islands of the west coast of Scotland; and it appears almost certain that these birds generally breed earlier in the inland localities of the eastern watershed than they do upon the western seaboard and islands.

Any startling differences in the relative times of breeding of Oyster-catchers on the east and on the west coasts of Scotland become more interesting from a migrational point of view, and also from the point of view of dispersal, when a few other facts are added. Mr. J. Armistead[1] writes us:—'I saw numbers of Whimbrels, Knots in winter plumage, Dunlins in summer plumage, and Oyster-catchers, all still in flocks, on the Irish west coast (co. Mayo) on May 11th and 12th (*i.e.* 1895).' Such notes have significance if read aright, and also can afford abundance of material for theoretical disquisition.

Family **SCOLOPACIDÆ.**

Recurvirostra avocetta, *L.* **Avocet.**

O. A. J. Lee, in a letter dated September 13th, 1887, writes:—'I send a curious skull I picked up from a mass of draggled black and white feathers (here comes a sketch of the skull itself). That is about the shape of it. I think it was an Avocet's; it was in a marshy piece of moor down by the sea.' Mr. Lee did not send the skull at the time, but we had an opportunity shortly afterwards of seeing it in Edinburgh, and were convinced that his identification was correct.

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[1] The well-known pisciculturist.

All other records are unsatisfactory, so far as we have been able to judge, especially Edward's slipshod note, 'More rare than the Greenshank,' and the giving it a place amongst the birds of Strathbeg Loch, which is outside his (and our) area.

[Himantopus candidus, *Bonnat.* Black-winged Stilt.

The only mention we have of this species in our district is in a letter from T. Macpherson Grant to Dr. Gordon, dated 21st November 1844 :—'Some years ago I saw two remarkable birds not far from Grantown, which I supposed to be Black-winged Stilts (*Himantopus melanopterus* of Jenyns). They rose out from among the long grass by the margin of a small lake in a piece of wet meadow ground near the Spey, and frequently lighted again, but always at a great distance. They were so extremely shy that I found it impossible to get within shot, and having no telescope, I could not make myself certain of the species. They had long legs, with much of the plumage pure white, and seemed to be about the size of the Stilt. My want of success in procuring one of them disappointed me greatly, and I have always much hesitation in recording a rare species, unless I have actually handled it.'][1]

Phalaropus hyperboreus (*L.*). Red-necked Phalarope.

Edward says :—'One male shot on the beach at Banff in the spring of 1855,' and we have only one other positive record of its occurrence in our present area. Dr. Gordon saw one in Brown's shop in Forres, which was obtained near that town on the 8th December 1890.

Although this species is known to breed in Orkney and Shetland, its migration fly-lines trend much more westerly, and along that fly-line we find it breeding in the Outer Hebrides. We think it extremely unlikely that east of Scotland localities will be filled up with breeding Phalaropes, at least for a long time. It is curious, but undoubted, that our east coast of Scotland does not harbour during migration such species as Red-necked and

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[1] We consider Mr. Macpherson Grant was such an excellent observer, that we would be inclined to admit the above without brackets, but it is better really to adhere to our rule.

Grey Phalaropes, except on phenomenal occasions, whilst at the same time it is regularly haunted by such species as Purple Sandpipers and Turnstones. Both species of Phalaropes seem to be influenced at once in the direction of their flight by the Pentland Firth, and seek the west. Their origin is both north-west (Iceland) and far north-east (Russia). The Turnstones and Purple Sandpipers, which latter breed in Faeroe and north-eastwards, seem to spread all over our coasts, both east and west, perhaps most abundantly in the west and Western Isles, yet are still extremely abundant on the Berwickshire coast and about the south shore of the Firth of Forth.

Phalaropus fulicarius (*L.*). Grey Phalarope.

A specimen was shot by W. Houston, Esq., on the links at Kintradwell, Brora, in December 1869. Another was obtained at Embo, near Dornoch, and preserved (W. Baillie, Aug. 1892).

Edward records three others procured on the sands at Sandend. A female was found at Nairn, December 1879 (vide *Inverness Courier*, December 25th, 1879). Brown says it is 'rare' at Forres.

Scolopax rusticola, *L.* Woodcock.

Writing of this species in 1848, St. John says of it, in Sutherland, that '*of late years* it has commenced breeding also in most of the large woods' (*Tour in Sutherland*, vol. i. p. 137).

We have italicised the words 'of late years,' as this makes the Woodcock a breeding species even so far north as Sutherland for nearly half a century. Now, of course, it is a well-established breeding species everywhere throughout our present area.

Writing again in 1846, the same author remarks that a few years ago no Woodcocks were supposed to breed in Great Britain, except a few wounded birds, but that, since the great increase of plantations, 'great numbers' remain behind for that purpose, mentioning especially in this connection the woods of Altyre and Darnaway (*Wild Sports of the Highlands*, p. 220).

In the *Proc. Zool. Soc.* for 1832, p. 133, will be found a very interesting communication from Sir F. Mackenzie on the breeding of the Woodcock at Conon, Ross-shire, to 1832, of which the following is a condensed extract:—For several years previous two or three of these birds had been seen in the woods, and almost five years before, a couple were shot just before St. Swithin's day; but, being covered with fat, it was evident they had not bred, and it was not until 1832 that the keeper could find a nest or young. In that year, however, he found four nests, all of which hatched out.

The article winds up by saying that 'it is probable that the parent birds sought this spot for the purpose of breeding, as they must have arrived in the spring from other localities; for those who shot the covers till February declare that they did not know of a single Woodcock being then left in them; and had there been two or three, the keeper must have been aware of it.'

Of its nesting much lower down the straths, and closer to the sea-level, it does not appear to have done so abundantly when Edward wrote of his district, as he only says 'a pair or two were known to have bred.' Since then, however, as at the present day, the birds have bred regularly and plentifully, even close to the sea, as, for instance, on the Bin Hill of Cullen and the Knock of Banff, as mentioned by Dr. J. O. Wilson in 1888, and it may now be looked upon as an abundant and still increasing breeding species.

Of the more recent history of the Woodcock in Scotland, and in our area in particular, it is well known to almost every sportsman how rapidly they have increased within the last thirty or forty years. The older records are perhaps the more interesting, whilst the later records are so numerous as to be already the common property of every one pretending even to the claim of sportsman or field-naturalist.

The Woodcock indeed is almost universally a breeding species, often in the least likely haunts; witness the treeless island of North Uist, one of the Outer Hebrides (vide *Annals of Scot. Nat. Hist.*, 1892, p. 73).

Along the east coast of Sutherland odd birds are occasionally found in September, but these are probably birds that have been reared in the neighbouring woods. A few more appear in October, but the great bulk arrives in November. As elsewhere, their return in spring here is not so easily observed, but it would appear that the first or second week in March is the usual time; as, for instance, in March 1891, when there was an unusual storm, the

Woodcocks were found about Kintradwell, Brora, in great quantities, *along with larks*, also in large numbers, and as these latter birds are not common in that district, we must conclude that this was a checked migration.

It seems to us that Woodcocks in the north of Scotland prefer to breed in birch woods rather than any other description of woodland, though locally in other parts of Scotland they are equally fond of oak-coppices. And, *à propos* of their breeding, we should be glad to know what happens to the very great numbers of birds during September that are bred in this country ; that is to say, up to August or near the end of that month the Woodcocks are to be found in their breeding haunts, but after that, and until the autumn migration sets in, scarcely one is to be seen in the woods where they were so common in the summer. It is doubtful if any remain in eastern areas, but of course some few remain in the higher lands of the west, but nothing to what were bred. Such at least is the result of our observations, and we notice that when St. John wrote he made the same remarks. On their arrival in the autumn, Woodcocks are spread, in the north at least, over the hills, certain favourite localities being always occupied ; they are not scattered broadcast, only certain districts, even spots, being inhabited. In steep hilly ground we have only found the birds at a certain line on the hill-side, there being very few either above or below that line, except in the case of certain favoured localities, or when there are woods. Frost, unless very severe, is rarely sufficient to drive the birds down to the coast and the neighbouring woods, but a heavy fall of snow, combined with frost, or even an ordinary fall, *if the storm is likely to be continuous*, will do so in the course of two or three days ; it is very rarely that the birds come down during the first day or two.

The numbers of migratory Woodcocks vary remarkably in different years. One of the most remarkable for numbers was the season of 1890-91, when the amount bagged must have been enormous, from all the accounts we received and heard of, and from what we saw ourselves in the northern parts of Scotland. On the other hand, the season of 1892-93 was one of, if not the, poorest on record, from all the reports that have reached us, as well as our own observations.

Woodcocks are repeatedly designated by observers as 'very abundant' in Strathspey: they are observed most abundantly, however, in spring.

In some years a migration occurs in *April*;—a great 'rush' of passing migrants was observed early in April 1891 (Hinxman). The so-called 'return of the Woodcocks' takes place in Stirlingshire and south of the Grampians usually in March, especially between the Firths of Forth and Clyde, the fly-lines trending towards the north coast of the Firth rather than towards the south coast. Many pairs remain to breed in the forests of Spey, but perhaps not so many as are to be found along the birch-clad slopes of our west coasts. A curious inquiry might arise: Did the Woodcock not *always* breed in North Britain, but in the latter end of last century become rarer owing to physical changes? Did it not then become resuscitated in Speyside, without becoming extinct, also according to changes of physical conditions? Who can say? Some may find fault with us for even proposing such a question,—but data accumulated regarding the fly-lines of several other species induce us to start the inquiry.

In 1879, during a very severe winter, 'nearly five hundred Woodcock were killed along the shore below Lossiemouth and Burghead in Elgin, and at the time were supposed to have come from the opposite side of the Firth, if not from still farther north (Dr. Gordon, *in lit.* 24th Jan. 1879). Another account says:—'Large flight of Woodcocks in the severe winter of 1878-79 at Duffus and Gordonstoun and Bin Hill, near Innes House. Over three hundred killed near Covesea, and many at Inverugie, and also at the Blackhill, Speymouth. They appeared to have come from Sutherland, where the frost was intense and long continued' (*Fauna of Moray*).

Yet again, at a later date, we have an account of another great invasion. Dr. Gordon writes us, Feb. 14th, 1889:—'In the severe weather of the beginning of 1889 a large flight *came down to the shore*, and it is believed by Captain Dunbar-Brander to have come from the interior and not from across the Firth, as related of the much larger flight several years ago.' With Captain Dunbar-Brander's opinion we are inclined to agree.

Now, these flights are of common occurrence in severe weather in Moray, and may be accounted for, we believe, in somewhat the following manner: If the whole country suffers under a universal snow-storm, with little or no drift, and attended with frost, Woodcocks would find no resting-place for their feet until the shore-line is reached. If drifting occurred, however, there would be here and there patches of earth and feeding-ground left bare. Captain Dunbar-Brander expresses a similar opinion when writing to Dr. Gordon in 1892:—'They fly on till they come to the sea. If they were migrating, the sea would not stop them, but as they are only shifting their quarters they do stop there, and alight along the coast wherever they see a bit of vegetation, a tree, or the top of a whin-bush. If a Woodcock were leaving the valley of the Spey, I have no doubt the moment he topped the intervening ridge he would see the sea—black amidst universal white; he would see it looming dark in contrast to the snow-covered ground, and he would make for it, and, on arriving, would pitch by the side of it.'

Albinos are occasionally reported, such as one shot at Duff House, near Banff, which is now in the Duff House collection, and was seen there by us in May 1891.

The Woodcock is 'not rare' in winter around Rothiemay, and is found in most suitable woods, but during several years of late Harvie-Brown has not met with it in spring in the same district, nor anywhere along the Deveron valley. However, as he was principally engaged in fishing, really good opportunities were not so numerous as might otherwise have been.

Since the above remarks were penned, the autumn migration of 1892 has passed. There was scarcely any arrival of Woodcocks in October anywhere throughout Scotland, and, more marvellous still, there was scarcely any migration visible in November—when the principal advent of the birds takes place—but on January 2nd and 3rd, 1893, from all over the country, but especially in the west, we received the tidings of a 'rush' of Woodcocks. What were these birds doing here at that season? Where did they come from? Our own ideas were at first that they formed a late arrival of the November flight, and in this belief Mr. John Cordeaux joined us, but since we have thought more about it, we have come to a different conclusion, viz., that the November 'great flight' took place at its usual 'appointed' time, but under such abnormal conditions of weather, both at home and on the continent of Europe, that we, in our little isle, saw nothing of it, and that, when the severe 'nip' of frost, and especially snow, took place on the Continent, the usual migratory instinct of preservation forced them to return towards the milder influences of the Gulf-Stream-favoured isles. This must not be confounded with the 'return of the Woodcocks,' a term well known and understood, in our central districts of Scotland, to sportsmen and gamekeepers alike, and which usually takes place not before the 10th or 15th of March—*i.e.* in these said districts, and no doubt with modifications elsewhere within the British Isles. But, along the flatter shores of the east coast of England, where there is little variation in levels, Woodcock shift their ground from easterly and colder quarters to warmer and westerly localities in our isles, thus performing a drift or embryonic migration. In the rugged ground of Scotland, where altitudes go up to 3500 feet or more, Woodcocks shift their ground only from higher snow-covered ground towards the sea-margins; and, consequently, our Scotch January birds are only natives, and not true migrants, though still showing the causes which guide migration, if accentuated.

Mr. Chisholm writes us that he came across a Woodcock's nest near Foyers on March 21st, 1893, containing two eggs—a very early date so far north. They were breeding more numerously than usual there in the summer of 1894. Woodcocks there, as in so many other places farther east, seem utterly to disappear after the breeding season.

The more experience one gains in shooting Woodcocks in the month of January in the western parts of Scotland the more certainly is he bound to believe that the birds found there are a steady, unvarying quantity, far less dependent upon foreign immigration than upon local movements of what may indeed be considered resident stock. In a quite different position—or faunal value—we believe are the great halting-places among the isles, such as Eigg, Rum, or the Ross of Mull, which are not, and never are likely to be, entirely dependent upon their home-bred birds. The west mainland coasts are *less in the true line of foreign immigrant hosts* than the Hebrides and Ross of Mull, though they, and perhaps some of the Inner Hebrides, are more in the line of home-bred birds passing due north to south. They are, *first*, dependent upon quite local stock; *second*, upon stock bred farther north in the west of Scotland; *third*, upon stock bred across the watershed to the east—still *home-bred* birds;—and *last*, and much more rarely, upon foreign—Scandinavian or European—stock. Our eastern coasts, on the other hand, are more directly dependent upon stock bred far in the east, which reach our shores on an east-to-west migration. Such, at least, is our own acceptation of the sequence of the turning-points in migration, not only of Woodcocks, but of many other species besides.

Gallinago major (*Gmel.*). Great Snipe.

It is possible that this species is overlooked, and that it may therefore be commoner than is supposed. We have a notice of one killed at Glenshiero, Kingussie, Inverness-shire, in September 1884, and sent to Macleay of Inverness for preservation. The low flats, bordering the Spey about Kingussie, would seem, when not too flooded, well adapted to attract such a bird on migration, but we have come to consider that the whole Moray Basin does not, at the present time, lie in the true path of their migration.

Gallinago cœlestis (*Frenzel*). Common Snipe.

Though resident and breeding throughout the whole of the north of our area, the Snipe can nowhere be called abundant. Of course there are certain localities where they are more numerous than elsewhere, and on migration any flooded meadow may attract them; on one occasion we killed seven couple on the Upper Brora, but these cases are exceptional in such a locality. They are not uncommon at times amongst the grass that grows on the mud-flats of the Beauly Firth—a locality similar to that often chosen in Canada by Wilson's snipe.

Even of this familiar bird the *O.S.A.* is very uncommunicative, as compared with its notices of it in other districts—Kirkhill (vol. iv. p. 114) being the only locality given.

The Snipe is not, however, such a very abundant bird on the dry, gravelly soil of Moray and Spey, as in moister and more suitable districts. It may even be looked upon as uncommon, over very large tracts of pine-forest and the gravelly, stony, or sandy soil, upon which pine-forests principally thrive. But in marshy bits, between the dry Culbin Sands, along the marshy haughs of Spey —where it breeds plentifully, by certain marshy-edged lochs like

Phitiulais—and far up amongst the upper haughs of Badenoch, and certain parts of the Monadhliath mountains, it is quite common in the breeding season, even to some extent nesting by the shores of Lochandorb, as it certainly does around Spynie, on the moors above the Deveron, and along the Isla and the moors of Keith and Auchluncart. It is very generally dispersed over Lower Banffshire, but is rarer by the sides of woodland lakes, like those of Rothiemurchus, Abernethy, or the wood-encircled Lochnabo.

Brown of Forres mentions that a yellow Snipe with white quills and light brown markings was shot at Westerton, Pluscarden, on Sept. 14th, 1894.

Gallinago gallinula (*L.*). Jack Snipe.

Rarer than the Common Snipe, and only a winter visitant over the whole of our area.

[Macrorhamphus griseus (*Gmel.*). Red-breasted Snipe.

One is recorded from the sands near Banff by Edward, 26th Sept. 1858 (*Zool.*, 1858, p. 6269), but he did not handle the bird.]

Tringa alpina, *L.* Dunlin.

Local Name.—Dorbie.

The Dunlin would only seem to be even fairly abundant in one part of the north of our present area, viz., on the wet flows of Sutherlandshire. Elsewhere it occurs in scattered pairs, as we noticed was the case on the hills about Invergarry. They come down to the shore about August, and in certain places gather into large flocks.

Booth obtained specimens of the Dunlin near the Fendam, East Ross-shire, in June, and Sheriff Mackenzie records it as breeding near Dornoch.

South of the Ness, Kirkhill again stands out as a favoured locality (*i.e.* favoured by the *O.S.A.* recorder !). Edward says, 'a few breed,' and he speaks of large flocks in autumn. He also mentions the fact of the larger race having the shorter bills.

Dr. J. O. Wilson does not feel certain that he has seen it in the Huntly district, but Hinxman observed it on the Ladder Hills in May 1887.

Mr. John Young found Dunlins breeding near Nairn, and Harvie-Brown observed them at the partly dried-up loch of Buckie among the sandhills. At Birnie, upon every occasion on which Harvie-Brown has visited that locality, he has found some,—more or less.

Brown of Forres records it as common, appearing in flocks on the shore from September to the end of spring, but he does not take any notice of its nesting near Forres. He however found it breeding up the river Findhorn in 1887, in which year the species was very abundant, and also at the loch of Hatlen in the parish of Kinloss, where it was very numerous in 1894. Mr. J. Backhouse, junior, says it breeds high up among the western ranges of the Grampians on Carn-na-Cairn and Dalnaspidal, and a little to the north of Glas-mheal-mhor. 'A few pairs'—Hinxman tells us—'breed about the peat-flows on the hill-tops at the head of Glen Livet in April and May.'

In 1893 Hinxman writes: 'Both on the hill-tops, between the Upper Cabrach and Blackwater, and in the mosses in the glen about Cairn-brallan, I never remember seeing so many Dunlins.' Hinxman has found them up to an altitude of 2300 feet, and this was also noted by Harvie-Brown later, in the same places.

In 1893 we flushed a family party of Dunlins from the river-side in the Upper Cabrach on the 27th July; they rose like Jack Snipes, and then, collecting together, circled upwards, and flew away as far as the eye could follow their flight on a due south-west course by compass. We believe these birds to have been reared among the mossy summits of Carn Grumach.

Tringa minuta, *Leisl.* Little Stint.

St. John remarks that this is the smallest and rarest of the waders, appearing but seldom on our coasts. Yet is included by Edward in his list, and also by Major Chadwick (1888).

O. A. J. Lee remarks:—'Many seen at different times; one or two at the beginning of August; lots later on' (1887).

[Tringa temmincki, *Leisl.* Temminck's Stint.

Edward says:—Mr. Taylor, gamekeeper to the Earl of Fife, once shot a specimen on the Deveron Bank (by which it is presumed

Edward meant the natural break-water of shingle at the mouth of the river Deveron at Banff).]

Tringa subarquata (*Güld.*). Curlew Sandpiper.

St. John remarks that this species visits the coast of Morayshire regularly in September, and that he has seen considerable flocks of them. A few remain through the winter, and are then generally found singly. O. A. J. Lee found seven specimens among a lot of Dunlins on August 24th, 1887.

Edward can only claim to have 'met with one specimen of which I can speak with certainty.' But, as might be expected, it is not rare about Findhorn Bay (*auct.* Brown of Forres). Mr. John H. Teesdale, who has kindly sent us some notes on birds seen in Findhorn Bay in the autumn of 1892, remarks: 'I noticed the partiality this bird had for a large stone surrounded by water,' an observation also made by Brown.

Tringa striata, *L.* Purple Sandpiper.

This species is very common along the coast from Helmsdale, as far as Brora and Golspie, the low rocks and stones being exactly suited to it. Farther along the shores it appears to be only an occasional winter visitant, though St. John remarks that it left his part of the coast during that season, and only appeared in autumn.

Edward has seen twenty-three killed at one shot. Smith does not include it in his lists, and there are no specimens in the Banff Museum. It is reported by Brown as of rare occurrence near Forres.

Tringa canutus, *L.* Knot.

A very abundant autumn and winter visitant to certain localities. St. John says it is seen in immense flocks on the shore between the Nairn and the Findhorn. On the Dornoch Firth it is common in winter, and Mr. Jennings writes that it occurs there 'at times in immense flocks.' Booth mentions meeting with several large flocks, 'composed entirely of immature birds,' in the same locality, as early as July 8th, 1868. Occasionally flocks come up the Beauly Firth, but wading birds are not generally so numerous so far up as they are lower down the Moray Firth, about the mouth of the Findhorn, and between that and Nairn.

Edward says :—' a few on autumn passage.'

In 1885 reported common and abundant by Brown of Forres. Arriving in September and departing in April, in small flocks on the shore.

Machetes pugnax (*L.*). Ruff.

The Ruff has occurred on one or two occasions in the Sutherland portion of our area, once on the 8th of September 1890 up the Cassley strath ; and another was shot on the Dornoch Firth by a son of Sheriff Mackenzie. Macleay once shot one at Clachnaharry, near Inverness, but did not remember the date.

St. John seems only to have met with this species once, when he shot one, a solitary bird, near the mouth of the Findhorn.

O. A. J. Lee, on August 19th, 1887, saw about four pairs of Ruffs. 'No bird had the same coloured plumage, or anything like the others, some being buffish with brown and black marks, some blue-grey, and some chestnut. They were very shy.'

Edward says :—about three obtained—all in autumn plumage. There is one in summer plumage in the Banff Museum, but without any label or history. In 1880 a male and female were obtained by Captain Dunbar-Brander, and sent to the Elgin Museum. The same gentleman shot a female at Pitgaveny in the autumn of 1884, and presented it to Campbell Macpherson Grant of Drumduan, Forres.

On the 10th September 1887 Brown shot a solitary Reeve near Forres, which he preserved. This bird had the second and third toes of one foot joined together, one nail serving for both toes.

The Ruff is considered of rare occurrence near Forres, but Brown saw ten Ruffs and Reeves near Findhorn, varying, as they usually do, in size and colour. He examined them with his glass, and shot one.

Calidris arenaria (*L.*). Sanderling.

Not a rare bird in autumn and early winter on those parts of the shore suited to its habits. It is often seen on the sands about Brora.

St. John remarks that it is common, though not numerous. O. A. J. Lee has seen them near Forres as early as the 5th of August, and Booth obtained specimens on the Dornoch Firth in June 1869.

Edward says:—a regular visitant, generally arriving in August, a few remaining over the winter. Edward adds:—'It is also met with in summer,' but by this we believe late spring is intended; and Brown of Forres says, bearing upon this:—'Common. Appears in the beginning of September and departs in the end of spring.'

Totanus hypoleucus (*L.*). Common Sandpiper.

Local Name.—Kittieneedie, Sanny (*i.e.* Sandy).

We doubt if there is a stream of any size in the north that is not inhabited by several pairs of these birds; every burn, river, or loch we have visited has its population of Common Sandpipers.

Mr. Muirhead says they are particularly abundant about Glen Urquhart, more especially at and near the mouth of the Coilty. We have only twice observed this species on the shore, and obtained a specimen in 1895.

Edward says:—'Common.' Dr. J. O. Wilson:—'Very common.' It is not, however, in Smith's list, nor represented in the Banff Museum.

The species is very abundant in all the lower reaches of Deveron down from Beldornie, but rarer higher up the river. In July 1890 it was almost, if not quite, absent in Upper and Lower Cabrach, having already migrated; during two successive Julys we noticed their rarity there. In July 1890 Harvie-Brown was there for a fortnight during that month, and saw very few indeed, though it was a fine warm, dry season. In 1891—a cold, wet, boisterous time—he was there again in July and August, and the Common Sandpiper was utterly absent, though it was common in Upper Cabrach in June 1892. The Common Sandpiper migrates southwards very early.

On the Findhorn we made the following note:—'Towards the close of July Sandpipers are less seen near their own breeding haunts, and the upper reaches of our streams are almost depopulated of them. They have begun to move away, taking up the feeding-grounds left behind by others of the same species; for

Sandpipers do not appear to flock as most waders do, and are seldom or never seen in numbers together during autumn migration.' Lower down the river Findhorn, Brown of Forres says that they depart in September.

Totanus ochropus (*L.*). Green Sandpiper.

As already related, a Green Sandpiper was shot at Helmsdale in the winter of 1879 (*Fauna of Sutherland and Caithness*, p. 222).

One of these birds was shot at Sanquhar near Forres, in August 1884, and sent by Brown of Forres to Harvie-Brown for identification. The specimen was, unfortunately, too far gone for preservation.

Another specimen was sent on to Harvie-Brown for identification by Dr. Gordon, with a note, dated September 2, 1886. It came into the possession of Brown of Forres when in the flesh, and was killed near that town.

[Totanus glareola (*Gmel.*). Wood Sandpiper.

This species is included as 'once only seen in fourteen years at Moy' by Major Chadwick, but it appears uncertain that it was not a Green Sandpiper. It is said to have bred near Elgin (*Ibis*, 1865, p. 435).]

Totanus calidris (*L.*). Common Redshank.

Common and resident, going up the straths to breed, and returning to the shore directly the young are able to get there. The Redshank arrives at its breeding-grounds in April, and often lays at the end of that month, as we have taken a full nest on the 4th of May, and the birds do not always lay their four eggs on successive days. Redshanks always, in our experience, choose green ground for nesting on, not heather.

Round Badenloch the birds are very numerous, and make their nests in tufts of grass on ground that was once under cultivation. They are rather local, because other places, apparently possessing the same capabilities, are frequently unoccupied by them.

About Invergarry, Redshanks are common, and breed in the valley of the Upper Garry; we saw a few pairs, also, in a marsh at the head of Loch Luichart.

'Here and there on the shore; breed inland,' is Edward's record. The Redshank is fairly abundant all over our area; it is seen as high up the straths as Delnabo and Tomintoul, on Avon, and the bases of the Cairngorms.

It is less abundant along the Deveron. Two or three pairs nest between Corniehaugh and Avochie (Lower Deveron), and a few pairs along the Isla. We did not observe it on the Upper Deveron in July, but met with a few pairs there in June 1892. It appears to be another somewhat early autumn migrant, like the Common Sandpiper.

The Redshank arrives early in April. We have observed a somewhat earlier appearance of both it and the Common Sandpiper near the heads of the glens of Moray, and the eastern rivers of Scotland, than lower down the same streams, indicating, we believe, the routes of spring migration. According to the advancing seasons one would expect the lower and earlier districts to be populated first, but, at least in the case of these two species, and probably of others, this is not so.

The Redshank would appear to be still a spreading species. It is said not to have occupied certain peat-moss land near Freeburn and Tomatin on the Findhorn until quite of late years. On the other hand, Lewis Dunbar assures us they were abundant thirty years ago in the adjoining valley of the Dulnan. They do not appear to be very abundant in the forest districts of Spey—not nearly so abundant, at least in May, as the Greenshank is around Loch Morlich.

The Redshank was considered by Hinxman, and also by ourselves, as unusually abundant in the Carn district of Glen Livet, Deveron, and Fiddich in 1892. Undoubtedly their numbers—like those of many species—fluctuate with the seasons.

A few pairs breed about the east end of Loch Spynie, but they do not seem to be particularly numerous in that locality.

Thirty years ago, however, far up Strathspey and along the meadows of Badenoch and Lochaber, we can remember how abundant this bird was at these higher elevations beyond Kingussie, especially alongside the slow-flowing upper waters of Spey, the pike-haunted backwaters and old courses of the river between Cluny Castle and Dalhooley, as well as the Mashie Burn and beyond the falls of Beltaig.

We have seen Redshanks flying from north-east to south-west over the skyline of the valley near Dalnaspidal in July, and in the same month Mr. Backhouse has again observed them, of late years, at the same place.

Of their nesting at or near Tomatin, Mr. MacBean says:—'They appeared in considerable numbers at Tomatin in 1890, nesting on spots previously occupied by Golden Plovers. They nest within 300 yards of Freeburn Hotel, in the mosses, and 150 yards from where people cut peats.' We have eggs in our collections taken as long ago as 27th May 1870, near Feabait, Glen Avon.

Totanus fuscus (*L.*). Spotted Redshank.

Brown sends us a record of Dusky Redshanks at the mouth of Findhorn as follows:—'When out shooting on the 20th August 1887, near the mouth of the Findhorn, I met with a number of Dusky Redshanks. They were very shy and difficult of approach, and I only managed to secure one young bird, which I have preserved'; and was seen by Harvie-Brown.

Totanus canescens (*Gmel.*). Greenshank.

The Greenshank is perhaps commoner in the area of Moray than in any other part of Scotland, and nowhere more so during the breeding season than in the wild flow-grounds and flat wastes that lie about the head-waters of the Helmsdale, Brora, and Shin. They arrive in April, and are then seen constantly along the rivers' sides. To the Dornoch Firth and suchlike estuaries the Greenshank is only a casual visitor, and is mostly seen in such situations in the autumn. Booth found them 'particularly numerous' on the muddy islands at the head of the Cromarty Firth in the beginning of August.

In the neighbourhood of Guisachan the Greenshank is a rare bird. We saw one there in May; most probably its mate was nesting in the vicinity. In 1883 one was sent into Inverness for preservation from Invergarry, where they are said only to have bred within the last three years (1892). We ourselves saw a pair on a small peninsula at the foot of Loch Garry in that year.

As recorded by Mr. Hoy, 'one was shot at Gordon Castle by Sir A. Mallett on September 6th, 1822.'

Edward considered it a rarity in the east of our area, and mentions only two which were obtained in the Moss of Banff.

The Greenshank is one of those species which, to our own certain knowledge, has extended its distribution in Moray within our own vivid recollection.

In 1873, only two, or at most three, pairs of Greenshanks had nests near the watershed of Truim and Tay, and that season young were found. Long prior to that year Harvie-Brown had been intimately acquainted with the districts around Dalwhinnie, Laggan on Spey, and Loch Laggan, dating, indeed, back to 1865, and before that year had no knowledge of Greenshanks breeding anywhere thereabouts, although the Redshank along the Upper Spey was well known to him, and ever present. He is perfectly certain none occupied certain localities between Dalwhinnie and Laggan which now annually hold their pairs of Greenshanks.

The Greenshank is now observed commonly on migration in autumn in the Bay of Findhorn and Culbin shore by Brown of Forres. Mr. John Young was told in 1885 that the birds bred among the Culbin sandhills, but there is no corroborative evidence forthcoming. Major Chadwick includes it in his lists, but presumably only as a passing migrant. Indeed, until much more likely areas are filled by breeding pairs, we can scarcely expect them to use the Culbins for that purpose.

One is in the Elgin Museum—'presented by Captain Dunbar-Brander, 15th September 1890, and three more were shot from a flock of about twenty together. Rare here' (copied from label). Hinxman usually sees a few pairs up among the lochans in the Abernethy forest, and adds, 'probably breeds,' and, later, positively states that it does so.

In 1885 Backhouse saw a pair at Loch a Choire Glas, close to the Laggan road, 2nd July—a locality certainly not frequented by them until quite of late years. He also found them in midsummer as low down the Spey as Glentruim, where the keeper shot one, a splendid old bird, in full summer plumage, on July 15th.

On May 16th, 1892, we found the Greenshank exceedingly abundant around Loch Morlich and at numerous small lochans in Rothiemurchus, in some cases evidently breeding, the majority, however, in pairs rising wild along the loch-shores. At least ten pairs were seen at one place.

We think it likely that the greater proportion of the Greenshanks seen at Loch Morlich-side are not breeding birds, but resting emigrants *en route* for farther north and north-west; but that some were nesting there also—because Greenshanks are early in their domestic arrangements—we feel convinced.

Limosa lapponica (*L.*). Bar-tailed Godwit.

Not rare in late autumn and winter about the Little Ferry, and now and then seen higher up the coast about Brora. In the Dornoch Firth it is common in winter, at times in very large flocks (Jennings). A few flocks are to be seen in the Beauly Firth in autumn.

O. A. J. Lee mentions seeing Godwits just at the mouth of the Findhorn on August 28th, 1887, and we ourselves saw a flock there in June 1891. St. John had observed them occasionally about Loch Spynie.

Edward includes it as a scarce but regular autumn visitant at Banff. They are common and abundant, however, farther up the Firth at Findhorn, appearing in September and leaving in spring. Harvie-Brown once met with one at close quarters in almost perfect breeding plumage on the shore of the Culbin Sands, on the 8th July 1887.

Limosa ægocephala (*L.*). Black-tailed Godwit.

One was killed at Loch Spynie in the autumn of 1878 by Captain Dunbar-Brander (*Fauna of Moray*, edition 1889, p. 59). Two were seen on the shore by J. G. Millais, Esq., near Fort George, in April 1890. Mr. Millais told us he was *quite sure* of the species.

Numenius arquata (*L.*). Curlew.

Although widely distributed, the Curlew is not equally abundant everywhere. We have found it most numerous in the breeding season on the Sutherland flows that are such a common feature in that county, least so in the districts about Guisachan and Invergarry. In 1847 Hepburn never saw one in the districts of Glen Affric and Glen Cannich, through which he passed, and they are not numerous there in these days. In winter they are more generally distributed along the shores.

The *O.S.A.* records it from Kirkhill. Edward marks it as plentiful. We found it common all along the course of Deveron, Isla, Bogie, and between Deveron and Ythan (of 'Dee'), and on Dunbennan Hill, and the moors and mosses from Huntly westward. Dr. J. O. Wilson also testifies to its abundance during the breeding season. It is seen up as far as Tomintoul in Glen Avon, and is common not only on the open moors on the hill-sides, but also on the bare patches of heathery ground, which are surrounded by pine and other woods at Dulnan, Rothiemurchus, Carr Bridge, Aviemore, and other forest-tracts. Indeed the species is universally distributed. Curlew-calls come down to us from high up in the sky, over valley or mountain-slopes, and parties of old and young, in the month of July, are seen circling, and prospecting, and calling to one another at immense altitudes in the sky, preparatory to their final departure for the shores.

Curlews were seen flying in a southerly direction in several groups, and calling, on the 6th August, by Mr. W. Evans.

A white Curlew was shot at Stratherrick in June 1870 (Macleay).

Numenius phæopus (*L.*). Whimbrel.

Occurs along the coast on both spring and autumn migrations. In the former season we have also observed them flying along the upper water-courses of the Helmsdale, and on one occasion a large flock lighted on a sandbank at the edge of a loch and remained there for a considerable time.

That Whimbrel pass up and down the Spey valley there is scarcely any doubt; close to the watershed we have ourselves met with them on their May passage, and on the river Pattack, near Loch Laggan, in May 1882. They flew with great speed down the valley of Pattack, *i.e.* towards the west. The Whimbrel occurs also on migration about Findhorn, where Brown of Forres has shot one or two specimens. He considers them common and abundant, however, in autumn. He records one (*in lit.*) shot there on 26th August 1891.

Edward enters it as seen in passing. Rev. Mr. Smith says of it:—'The Whimbrel has been heard flying overhead, being easily recognisable by its singular notes, but has never been observed on the ground, nor as a regular visitant to the parish' (Monquhitter). It is much less frequent than its congener, the Curlew.

Mr. W. Evans met with a solitary example midway between Kincraig and Alvie on the Spey, which passed over, flying in a southerly direction, and was calling loudly. This was during its migration season, viz. on the 4th August 1889.

Order **GAVIÆ.**

Family **LARIDÆ.**

Sub-family *STERNINÆ.*

[Hydrochelidon nigra (*L.*). Black Tern.

Our only and unsatisfactory record is that Edward 'only knew of one instance in Banff.' The incompleteness of many of Edward's records render them utterly valueless.]

[Sterna caspia, *Pall.* Caspian Tern.

Obs.—Referring to a Tern he saw at the Old Bar, Findhorn, on the 2nd, O. A. J. Lee says:—June 12th, 1887—'I saw the large Tern, which I think must be the *Caspian Tern;* it had a mate this time. Greyish back, white underneath, black on the head down to a line from the beak past the eye to the back of the neck, dark green feet, scarlet bill with a black point. The other had brownish marks on the back, and a brownish bill with a black tip.

'This is the second time I have seen it.

'It sits on the stakes of the salmon nets about seventy yards out, and I saw it through the glasses quite well.'

Here follows a very good sketch of the bird, the size of which, Mr. Lee says (under June 2nd), is a little less than a Lesser Black-backed Gull, and from this it seems very likely that his identification is correct.]

Sterna cantiaca, *Gmel.* **Sandwich Tern.**

The Sandwich Tern has bred in at least one instance as far north as Sutherland, as in 1878 a single egg, now in our possession, was taken there. We have since then seen the birds not far from the same place, but no other nest has, as yet, been found there.[1]

In a list sent by Mr. Norman to Dr. Gordon, of birds observed about Forres, there is this note under the present species:—'Common in spring. Breeds.' 1881.

Under date of May 1885, Brown of Forres says that the Sandwich Tern is not common, one or two small flocks being seen passing over in April.

We are, however, again indebted to our friend O. A. J. Lee for a full account of his finding a breeding-place of this species not far from Forres, and by his permission we here reproduce it in full, so as to give full justice to his discovery.

June 2nd, 1887.—'At ten o'clock I started to go to the Bar off the Culbin Sands, and after I had crossed the sandhills and come in sight of the Bar I found that the tide would not be out for some time. I got rather tired of waiting, so I determined to wade, regardless of wet. After wading about a hundred yards, most of the way above my knees, I suddenly saw a Tern get out of some bents on a roundish island with steep sloping banks of gravel all round it. I thought it was a very large bird, so, forgetting the wet and tide, I whipped out my glasses, and looked through them. "That 's a Sandwich Tern," I exclaimed immediately, "and there must be eggs there." So, regardless of wet, I dashed on through the sea, up to my waist often, to the great astonishment of some fishermen who were digging bait, and reached the Bar, and there, before my eyes, was the long-wished-for prize; one, two, three, dozens of nests of the Sandwich Tern, none of them with more than one egg, however. The nests were mere scratches among the dried seaweed and sea-campion growing down to the high-water mark, some of them among the bare stones, others on the sand, but none farther than four feet from high-water mark. Most of the eggs were laid with the points pointing to the middle of the nest, and, curiously, most of the eggs were pointing with the thin end to the north-east, as if all the birds had been sitting with their heads to the wind when they laid them. I counted thirty-two nests, and twenty of them had an egg in each.'

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[1] Since this was written Sandwich Terns have increased their range to the northwards, and been found breeding in a colony in North Ronaldshay of the Orkney group, as related by Mr. Briggs in *The Annals of Scot. Nat. Hist.*

The species occurs in most lists referring to the district of the south shore of the Moray Firth to the west of Speymouth. To Mr. Mackessack's knowledge, however, it has only once bred upon his ground to the east of the village of Findhorn, and he himself found the eggs, of which he has one in his collection. The large colony discovered by Mr. Lee was phenomenal, and has not since then occupied the same ground, to our knowledge. That year was phenomenal as regards the numbers of Terns of all kinds found along the south coast of the Moray Firth.

During most seasons, as we are assured by Brown of Forres, the Sandwich Tern is not common, and some years it is very doubtful if they breed at all, but only pass on migration in April. The year after Mr. Lee's find, Harvie-Brown found only one pair at the raised beaches at the mouth of the Findhorn. It would indeed seem that Sandwich Terns only occupy their favourite nesting sites at irregular intervals of years.

Major Chadwick, writing in 1888, speaks of twenty to twenty-five nests occurring every year at the same locality, but seems to consider that they were more plentiful in 1887. Brown—who visited the locality three times in 1888—expresses the opinion, that 'if the Sandwich Terns were less molested, they would stay and breed regularly, because they arrive regularly, but shortly afterwards disappear.'

A few pairs breed here and there occasionally in some places, irregularly in others, both east and west of Findhorn, and as far up the Forth as Nairn Sands and Fort George. Near the latter place Mr. Millais found a nest in 1891, and we heard a bird pass over us when in the Old Bar in the same year.

Sandwich Terns arrived at Culbin Sands on 15th April 1895, and other Terns a few days later (Brown, *in lit.* 14/v/95).

Sterna dougalli, *Mont.* Roseate Tern.

St. John says he has sometimes 'clearly seen' the Roseate Tern among flocks of the commoner species.

Since the statement made by Gray in his *Birds of the West of Scotland*, that the Roseate Tern still frequents the Culbin Sands, we have been favoured by O. A. J. Lee, with his notes made during the months of May, June, July, in 1887, while staying at Kincorth House, near Forres; and in reference to the bird now under treatment he says:—

'Coming along the Bar I saw two pairs of Roseate Terns, and, after hunting for some time, I found the nest of one with three eggs in it. I sat down and watched the birds go to the nest after flying about the sands for some time. She (? the female) had a lovely pink tinge on her breast and throat.' This was on May 20th, 1887, and along with the Roseate were many Common, but only two Arctic Terns. Nearly a fortnight later, however, he wrote:—'I saw hundreds of *Arctic Terns* breeding farther inland on the same island as the Sandwich Tern, but not one *Common Tern.*'

Again, on May 26th he writes:—

'Saw three Roseate Terns on the Bar, watched them for a long time; two of them had a lovely pink tinge on their breasts and under wing-coverts, the other had not, but I expect it was a last year's bird. They at length went to their nests, and I got two eggs in one, and one in the other; three more nests were empty. Saw altogether seven pairs of Roseate Terns.'

In 1866 Norman recorded one shot by Captain Ruxton and another by himself (*Zoologist*, p. 1067). Gray, without quoting authority, and writing in 1871, seemed to consider the species then present on the Culbin Sands. But the Culbin Sands themselves is scarcely a locality for Roseate Terns, now or then. There seems no good reason in our own mind to doubt the accuracy of Mr. Lee's observations made in 1887, but we doubt much if the locality where he found them affords them nesting-sites every season. The well-known 'shiftiness' of Tern colonies, often without any apparent reason, finds no exception in the conduct of the species at present under treatment; and where they are the least subjected to discomfort, anxiety, or even slight disturbance, Terns generally, and perhaps the Roseate in particular, become very shy of their last nesting-place. We possess three of the eggs taken by O. A. J. Lee on May 30th, 1887, and undoubtedly, and to a marked degree, this clutch carries the peculiar type, both in form and coloration, which Roseate Terns' eggs from America present. We showed these three eggs to Mr. William

Brewster[1] on the occasion of a visit he paid Harvie-Brown in September 1891, at Dunipace, and he was strongly impressed by their typical appearance. On the other hand, and as regards the Roseate Tern, Brown says:—'Terns were much scarcer in 1888,' and 'so far as known to me, none (and none of the Roseate Terns) bred at the locality this season.'

All evidence and every other circumstance considered, we think these eggs taken by Mr. Lee are correctly identified, and worthy of full record in a Fauna of Moray. But up to date of 1895 all efforts to find Roseate Terns there again, both by Harvie-Brown, O. A. J. Lee, and Buckley, have failed.

Sterna fluviatilis (*Naum.*). Common Tern.

Local Name.—Pictar, or Pickitar.

St. John considered this an exclusively shore-breeding species, but this is certainly opposed to our experience. Indeed, we have always considered it to be the one that most commonly breeds inland. At the same time, the Common Tern nests abundantly on, or close to, the shore, and we have seen a fine colony on one part of the east coast of Sutherland.

Booth obtained specimens for his collection in the Dornoch Firth in 1869.

The immense colony at the west end of the Old Bar of Findhorn, one of the largest we have ever seen anywhere, we are pretty confident is composed of the Arctic species. Mr. Millais has, however, identified the Common Tern as breeding near Fort George in 1891. A few pairs of the Common Tern breed also on some shingly banks up the Ness river.

Although Edward says nothing of this species, though he includes the Arctic Tern, the Common Tern is represented in the Banff Museum by both adult and young, and Smith includes the Common Tern in his lists, as also does Dr. J. O. Wilson.

On the Culbin Sands it is abundant, and indeed is the Common Tern in *fact* as well as in name. It breeds in isolated pairs far up the rivers, even here and there in the Carn districts, on islands and shingles of the Spey below Grantown (Evans), and as high up as Kingussie, as observed by ourselves many years ago.

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[1] Curator of the Cambridge Museum, Mass., U.S.A.

Brown says it arrives in May, and leaves the neighbourhood of Forres in September. We met with them also high up the Findhorn above Tomatin, and on the Dulnan above Carr Bridge, in July 1891. Also, in 1892, some pairs were found far up Glenlivet under the shadow of The Bochel, at Blye, and even higher up towards the Carns and sources of Livet, and on the Deveron above Beldornie.

Sterna macrura, *Naum.* **Arctic Tern.**

St. John remarks that the Arctic Tern is rarer than the Common Tern, and is more given to breeding inland than the latter species (*sic*).[1]

North of the Ness the two largest colonies of this Tern known to us are on the Sutherland coast, the largest perhaps being near the Little Ferry, on the gravelly beaches that lie behind the banks of sand and bent.

Edward says :—'Annual visitant, generally in autumn. Not known to breed within the area of Deveron valley, but known to do so farther to the westward.'

The Arctic Tern is certainly less generally distributed in the Moray area than the Common Tern, but, as elsewhere, the population of Terns—Arctic or Common—is often subject to strange fluctuations. O. A. J. Lee found only about nine pairs nesting at the Old Bar of Findhorn in June 1887. Brown characterises them as very common, arriving in May and departing in September, but he adds, 'not so abundant as the Common.' Mr. Mackessack finds a few on the east side of the Findhorn among gravelly ridges thrown up by the old tide-wash near the sandhills which fringe Burghead Bay. Take the whole coast of the Moray Firth, and there are really very few localities which offer likely holding-ground for this species, but abundant sites for the allied form. During all his visits to Culbin Sands, and other parts of the coast, Harvie-Brown has never seen the Arctic Tern in any quantity, and only in numbers quite out of all proportion to those of the Common Tern.

Mr. Millais and Buckley visited the Old Bar of the Findhorn in 1891, and both came to the conclusion that it was this species only that was breeding there, not the Common. Harvie-Brown visited the Old Bar again in 1893, and came to a similar conclusion. Without doubt, however, the Old Bar offers, far and away, the most likely Arctic Tern-ground of any part of the southern coast of the Moray Firth.

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[1] If this was indeed the case in St. John's time, the habits of the two species have entirely changed. It is the Common Tern which most frequently breeds inland, and the Arctic which principally nestles by the sea.

Sterna minuta, *L.* Little Tern.

St. John remarks that this species breeds in the same places as the Common Tern, but is much less numerous.

We ourselves have only once observed the Little Tern north of Inverness, when we saw a pair near Brora in 1871; they were reported to have been seen there again in 1877. One was shot at the same place in October 1890 (W. Baillie). The largest colony we have seen of these birds in the north is near Findhorn; a smaller one exists on the Old Bar.

Brown of Forres considers it common, but not abundant. To the eastward of Spey, and within the confines of our area, it is not common, and Edward says does not breed within the limits of the Banff coast. The 'shiftiness' of Terns is not easy to explain, and this species decidedly participates in the generic failing. In 1885, Mr. John Young, who visited the Morayshire haunts of the Little Tern, on purpose to obtain a nest or two of eggs, saw none in the end of May at either Findhorn or Culbins, but on 6th June—Little Terns are late of arriving at their breeding haunts—Harvie-Brown met with a few pairs at these places, and got a nest with two eggs. It is probable they had not arrived on the 28th May, when Mr. Young was there. Pairs breed during most seasons all along the suitable portions of the coastline between Findhorn and Lossiemouth, and as far also as Speymouth. But in 1887—a season in which, for whatever reason, Terns were apparently in unusual numbers along the Moray Firth—O. A. J. Lee, who was residing that summer at Kincorth, found a large colony breeding still further along the coast—nineteen nests in all—and all eggs were hard-set by June 15th or so. He kindly presented us with two sets, along with those of the Roseate and Sandwich Terns.

Sub-family *LARINÆ.*

[Xema sabinii (*Sabine*). **Sabine's Gull.**

Edward 'pursued one, but failed to obtain it.' We possess no other record !]

Larus minutus, *Pall.* **Little Gull.**

On 24th January 1894, Mr. P. Burgess, factor at Glen Urquhart, informed us *in lit.* that a Little Gull was found dead on the shore of Loch Ness on the 8th inst. He adds :—'It had probably been driven north by some of the recent storms, and, lighting on Loch Ness in an exhausted condition, was unable to support itself, and perished. I thought the little stranger rare enough to have it preserved.' Buckley saw the bird in Macleay's shop. It was in immature plumage.

Edward believes only two specimens have been met with in his district. He speaks of one as having been shot at Fraserburgh, in the extreme north-east of our area, on June 28th, 1854 (*Naturalist*, vol. iv. p. 226), which may account for one of the two; and Mr. George Sim informs us that Edward *did* possess a bird in 1854.

St. John records one as having been killed by one of his sons, in April 1847, at loch of Spynie (*Natural History and Sport in Moray*, p. 112).

[Larus philadelphia, *Ord.* **Bonaparte's Gull.**

Edward 'was informed that two of these birds were killed thirty years ago'!!]

Larus ridibundus, *L.* **Black-headed Gull.**

Common and resident, breeding abundantly in the Sutherland part of our area (*Fauna of Sutherland and Caithness*, p. 230).

Mr. Jennings says that the Black-headed Gulls breed at a marshy loch near Fearn, at a place near Tain hill, besides some smaller colonies. But to enumerate, even if we could, all the breeding-places of this bird, would be of no practical use. Suffice it to say they breed in many places through our area, and are increasing, though we know of no colony to equal that of Spynie, described further on.

Although the Black-headed Gull generally breeds in large colonies, sometimes isolated pairs are met with. We knew of one such pair on a loch within the Brora watershed, among a number of Common and Herring Gulls, but apparently there was little suitable ground for them in that place. In another part of the same watershed there was a very fine colony; but we never met with them spread out on the flows like the other species of gull.

Near Strathpeffer there is a colony on Loch Kinellan, and the birds during the summer come to steal the 'pigs' meat' at the back of the Ben Wyvis Hotel—scarcely the sort of thing one would expect this species to do at that time of year, when they are presumed to be principally insect-feeders.

Edward says:—'Not breeding in Banff, but does so in great numbers on either side.' Not observed in the valley of the Deveron by us in 1886, 1889, 1890, or 1891. Dr. J. O. Wilson 'cannot recollect' whether he had seen it 'near Huntly or not.' Hinxman, however, has seen it as high up the valley of the Don as Inverernan.

In 1885 we met with it first on Lower Strathspey, on 9th May, and it became common later on in the season. There is a splendid colony at Loch Spynie. Years ago, as Captain Dunbar-Brander informs us, only about seventy pairs bred there; they increased to a hundred pairs the year afterwards. Now, viz. in 1885, they may be counted by thousands. One day in 1885 from 1200 to 1300 eggs were taken by Captain Dunbar-Brander, only two days after they had been robbed before. On our visit to Loch Spynie in May of the same year, every nest contained three eggs. No other species of gull breeds at Loch Spynie.

In 1866 Norman spoke of three or four colonies in woodland lakes of Darnaway.

Before the loch of Buckie was partly drained there was an extensive colony there; now there are seldom any nests at that locality. At the present time, however, there are many localities where they have of late years taken up their abode. They breed in considerable numbers on two little lochs near the place marked on the map Craig-a-bheinne, close by the side of a disused road or path which crosses Blar-mor—the big moss near Carr Bridge. There are colonies on lochs in Altyre woods, as well as Darnaway, and 'there are several well-known gulleries of this species in the Abernethy forest, of which that at Loch na Chnuic is the largest' (Hinxman). A few pairs have lately frequented Loch a Choire, near Laggan—a locality not occupied when Harvie-Brown used to fish in that district about 1865. Along Findhorn there are colonies on the loch of Belivat, another on the loch of Boath, and a smaller one in the Dulsie forest (R. Thomson, Fernes, 21/v/92). There is a large colony also between Lochandorb and Grantown, on a mossy hollow among the hills. There is a considerable colony on a small loch close to Kingussie, and indeed many others too numerous to mention. Indeed, the Black-headed Gull is one of our most assertive and rapidly increasing species in many parts of Scotland.

Mr. Robert H. Read found a colony 'settling down to breed in the middle of a large wet bog at Lynwilg,' but in 1891 the nests of these birds were found utterly swamped by heavy rains having flooded the marsh. There were thirteen pairs on May 17th.

In the severely dry season of the autumn of 1887 Black-headed Gulls were seen perched on the house-tops of Forres, 'watching the wells. They were very hard pressed for both food and water' (Brown of Forres, *in lit.*).

In hard winters these birds get very tame, and haunt the houses about Inverness for food. We have had them come in numbers close to our dining-room windows to eat bits of bread put out for them and other birds. Writing in 1846, St. John remarks that the Black-headed Gulls are absent in winter, so it seems that it is only of late years that these birds have become residents.

In a letter we received from Captain Dunbar-Brander he writes:—'I don't know and I can't make out how the young Gulls are fed. There are now hundreds swimming about in the reeds (of Loch Spynie, which belongs to him). There may be a few flies for them in the loch, *but I have never seen an old Gull feed a young one*; besides, there are so many hundreds, all promiscuous, that she could never tell her own.'

Talking of over-preservation of certain species, we are inclined to think that this species requires no protection. It has been, and is, one of the most assertive and rapidly increasing birds over large and widely-separated areas of Scotland. But although thus far

[illegible]

assertive and procreative, it is not so certain that it is itself able to struggle and live against an undue increase of its own species beyond a certain point. We are aware that at more than one vast colony of these birds their natural supplies of food appear to be scarce or exhausted, and this has resulted in actual emaciation, weakness, and death, the birds actually having been seen to drop down dead around their nesting haunts; or it may be, in some cases, that owing to insufficiency of their natural food at certain important phases of their existence, that other food unsuitable to their condition at the time has been taken.[1] Another argument in opposition to the over-preservation of these birds is to be found in the fact that they consume vast numbers of young Salmonidæ, even attacking and killing young Loch Leven trout two years old, and this in the early spring months before they commence their breeding season.

Larus canus, *L.* Common Gull.

Local Name.—Sea Go (or Gow).

An abundant species, breeding either in single pairs or in colonies in many parts of our area, more especially, perhaps, in Sutherland, either on the shore or inland. They breed on the hill of Tain, and there is a very fine colony at Loch Lundie, near Invergarry.

Sometimes pairs of these birds place their nests among the stones or on small grassy tussocks at the edge of a loch or river, and as they lay about the middle of May, when the waters are low, we have often known of their nests being swept away when an untimely spate has come.

Edward says, abundant in winter and spring, but he did not believe it bred in the east of our area. It occurs in Smith's lists, and is represented in the Museum at Banff.

We have ourselves met with it commonly in summer, and earlier, as far up as Upper Deveron, and seen it even about the Upper Cabrach in August 1891; and it is known to breed in scattered pairs among the hill-tops of the Carn District of Spey, where we have ourselves often met with them, sitting in pairs on the plough-land below the heather. They breed also on the Carn hills between Deveron and Bogie near the summits of Carn Gruamach, and among the Correen hills of the area of 'Dee' adjacent; also among the Cromdale hills, and again high up the Findhorn, where we have seen many among small pools of water near the water-shed above Moy Hall and on Loch Moy itself. In 1887—a year noted for an increase in Laridæ—a colony formed and bred at Loch Hatten, in the parish of Kinloss, upon Mr. Mackessack's property. Brown says these birds are increasing around Forres 'beyond belief.' By that year their numbers had vastly increased among the Culbin Sands, where they breed, occupying the summits of the sandhills which have some covering of bents, however slight. Large flocks sit on the sands east of Findhorn—mostly young—in the month of July. The Common Gull also breeds upon islands of the Spey below Grantown (W. Evans).

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[1] We have often wondered what has been the direct cause of death amongst recently hatched and young of many species, which breed in colonies, at a stage *before* they would become dependent upon insect or other food, or could assist themselves, as is the case with Gulls, Terns, and Waders, etc.

Larus argentatus, *Gmel.* Herring Gull.

Local Name.—The young of the larger Gulls generally are called 'Shuggrie Willies' (Brown of Forres).

The Herring Gull breeds on the hill-sides and edges and islands of lochs in the Sutherlandshire part of our area, but appears to become less of an inland species the farther south we go. It breeds also on the hill of Tain, and in increasing numbers (Jennings, 1884).

On the east Sutor of Cromarty the Herring Gull breeds in immense numbers, and is quite *the* Gull of the place.

The species breeds abundantly along the north coast of Aberdeenshire at Gamrie, Troup, and Pennan Rocks, as recorded by Edward, Sim, and others, and witnessed by ourselves when we surveyed that coast in 1887 from Fraserburgh. In May they come up the rivers, and are seen over the inland moors. It occurs as far up the Spey as Kingussie, but not as a breeding species. A few pairs nest among the bented sandhills of Culbin near the coast, but it cannot be called a common bird there during the nesting season, as only a very few have been seen there by any observers.

Brown of Forres has obtained young unable to fly, and O. A. J. Lee and Harvie-Brown have both seen a few pairs there in midsummer. Large numbers of immature birds frequent the rocks near Banff harbour, close to the railway station, in April.

Larus fuscus, *L.* Lesser Black-backed Gull.

Local Name.—See under Herring Gull.

This species used to be very abundant in the Sutherlandshire part of our area, breeding in the same situations as the Herring Gull, but has much decreased of late years owing to the war that is waged against it by keepers. Mr. Jennings says that three or four pairs breed on the hill of Tain, with the Herring Gull, but both these keep apart from the Common Gull. We have seen the species at Invergarry, but did not observe that it was breeding.

Edward says:—'Met with, not plentiful; does not nest' (*i.e.* in the Banff district). But we have always found it common on the river Deveron, and on ploughed fields on the lower reaches, coming up from the coast about the last week in April or beginning of May; and recognised as 'common along our rivers, principally in spring and autumn,' by Dr. J. O. Wilson of Huntly. Decidedly commoner at these seasons than the Herring Gull. Hinxman identified this species as breeding in peat-mosses in Abernethy, and Mr. Lee met with it nesting sparingly on the Culbin Sands, and found amongst their eggs the variety which has reddish spots on a greenish ground, one of which he kindly gave us.

Larus marinus, *L.* Great Black-backed Gull.

Local Name.—Vid. ant.

By no means so numerous as the preceding species, though it breeds sparingly inland through parts of the north of our area, but as yet we do not know of it doing so south of Dornoch. We have observed a pair or two about the Old Bar of the Findhorn, nesting on the sands, and their deep notes may be heard almost any day on the shores of the Beauly Firth, an old pair and their young often being seen together.

On the east Sutor Mr. J. G. Millais found the Great Black-backed Gull evidently breeding in fair numbers on the tops of the isolated pinnacles, which were only accessible with great difficulty and danger.

Edward speaks of it thus:—'Only a visitant here, and *leaves before he gets his black coat*' (the italics are ours). Mr. George Sim says it is to be found all along the north-east coasts at all seasons of the year, but, he adds, 'I am not aware of its breeding there, although I have watched the bird flying among Herring Gulls whilst the latter were busy with incubation.'

Brown of Forres writes us:—'A few pairs of Great Black-backed Gulls bred this summer (1895) on the estate of Kinloss (R. Mackessack, proprietor); and I am also certain that the Great Black-back breeds on the Culbin Sands. Prior to these records we were not prepared to vouch for any nesting-places of the species upon the Moray coast districts east of the Old Bar.

Larus glaucus, *Fabr.* Glaucous Gull.

A rare visitor to the east coast.

A female killed at Gamrie is in the Banff Museum (Edward); and specimens are seen occasionally on the Culbin shore and sandhills (Chadwick). Dr. Gordon gives it a place in his *Fauna of Moray*. Mr. Allen, Peterculter, had one in his possession in 1860. The Glaucous and Iceland Gulls do not thus appear to come much inside the Moray Firth, but pass down the east coast of Scotland.

O. A. J. Lee mentions that he saw a pair of Glaucous Gulls in a corn-field near Forres on 12th May 1887.

Larus leucopterus, *Faber.* Iceland Gull.

Immature birds are not uncommon on the east coast in severe winters. One was killed as far inland as Fort Augustus on February 22nd, 1893, and we saw it in Inverness.

Dr. Gordon in his *Fauna of Moray* records both this and the last, as seen with Mr. Allen of Peterculter in July 1860, and adds they have been seen on the Moray Firth.

In 1892 we saw a fine specimen in the flesh in Brown's shop, Forres, shot at Dallas, about nine miles inland from Forres, by Mr. Robertson, gamekeeper. As it presents rather an interesting stage of plumage, we bought the bird; date of occurrence, 6th May 1892.

Rissa tridactyla (*L.*). **Kittiwake.**

On the south coast of the Moray Firth Kittiwakes are not very abundant, the suitable breeding area being restricted to the cliffs of Gamrie, Troup, and the coast on to Pennan. Edward says:—'Breeds with us, but not in such numbers as formerly.' It is often seen along the east coast of Sutherlandshire, most abundantly in the spring.

Pagophila eburnea (*Phipps*). **Ivory Gull.**

Edward mentions that several have been shot near Gamrie.[1]

One is recorded as having been shot on the 29th January 1847 whilst sitting on a rock about four miles east of Banff (*Zoologist*, 1847, p. 1700) by Rev. James Smith.

Brown of Forres observed an Ivory Gull frequenting the sand-hills and shore near the north-east end of the Culbins, about the third week in June 1888, associating with a number of other species of Gulls, and apparently acting as their sentinel. In a later communication he wrote, under date of 25th June 1888, that he saw a fine specimen of the Ivory Gull along with the Common and 'Yellow-footed Gulls,' and he adds that Mr. Robert Mackessack has several times seen the species there, but usually in the spring of the year. Dr. Gordon includes the Ivory Gull in his *Fauna of Moray*, but without remark.

Sub-family *STERCORARIINÆ*.

[**Stercorarius catarrhactes** (*L.*). **Common Skua.**

Of this and of Richardson's Skua, Edward has the remark:—'Both are met with as visitors—*the latter the rarer of the two*!' [The italics and the interjection are ours. 'Surely,' we think, 'there must be some mistake.']

Stercorarius pomatorhinus (*Temm.*). **Pomatorhine Skua.**

Four Pomatorhine Skuas were seen at Balnacoil, Sutherland, in 1879 (*Fauna of Sutherland and Caithness*, p. 235). One was killed at

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[1] Gamrie has a high precipitous coast.

Fraserburgh in 1881, and sent to Mr. George Sim, Aberdeen, for preservation.

Stercorarius crepidatus (*Banks*). **Richardson's Skua.**

Only one pair of these birds is known to breed irregularly in our present area. The species is seen off the coast in the autumn, and is not uncommon in the Beauly Firth. In the Dornoch Firth Mr. Jennings has only observed them in the winter.

Captain Ellice informs us in a letter, dated March 28th, 1885, that a Richardson's Skua was shot about four years ago at Invergarry, feeding on a Grey Hen.

There are specimens in Lennan's shop (Banff), obtained off the coast, and Brown sends us a note of one near Forres, sent in to him 14th September 1888.

Considering the large numbers of Richardson's Skuas which breed in Shetland, it seems strange how few, as a rule, appear on migration in most seasons.

Stercorarius parasiticus (*L.*). **Buffon's Skua.**

An example was killed at Netherdale (L. D.), and about the same time another was killed on Bennachie, and both birds were sent to Mr. George Sim.

Before this, Norman recorded two obtained near Forres about 10th August 1868 (*Zoologist*, 1868, p. 1200). Brown considers it of very rare appearance. He saw one shot on the Nairn sands in July 1882 by Colonel Baillie, which he preserved, and it is now in the mansion-house at Lochloy.

Order **PYGOPODES.**

Family **ALCIDÆ.**

Alca torda, *L.* **Razorbill.**

Local Name.—Marrot.

A few Razorbills breed on the east Sutor of Cromarty Firth, and along the north coast of Aberdeenshire they are found in considerable numbers about Troup Head. They remain all winter in numbers along the south coasts; but are less numerous in the north. Great numbers are at times washed ashore on the Sutherlandshire coast by easterly and north-easterly gales.

A Razorbill was shot by one of the Invergarry stalkers in Loch Lochy. Though not in our area, we mention this, as the bird does not often occur inland.

Lomvia troile (*L.*). Guillemot.

Local Name.—Quet.

Guillemots in scattered numbers breed on the east Sutor of Cromarty, and abundantly along the north coast of Aberdeenshire, especially at Troup Head. In January 1885 a forty-eight hours' gale compelled numbers of this species and Razorbills to seek shelter; many were blown inland between Burghead and Nairn, a distance of at least five miles from the sea, as recorded to us.

They are not uncommon along the shores of the Firth, and were specially abundant in the winter of 1879-80. They remain all winter along the coast, but are then less common than the Razorbill. Although a few are washed ashore along with Razorbills, they are usually only in the proportion of about one to ten of the latter.

Uria grylle (*L.*). Black Guillemot.

A few are seen along our north coasts in spring, autumn, and winter. Martin includes it in his MS. lists, as 'met with in the Moray Firth.' No doubt his remark applies only in winter.

The Rev. James Smith says that the Black Guillemot breeds in certain caverns along the coast, where at that time there were companies of them, and he had examined dead specimens, though he had not seen them alive. Mr. George Sim confirms this, as he shot a young one, which is still in his possession (*Zoologist*, 1850, p. 2913). We are doubtful of its breeding anywhere within our area at the present time.

Mergulus alle (*L.*). Little Auk.

An irregular visitant to the coasts of the north of our area, and occurs often at inland localities.

Edward calls it a winter visitant. In December 1845 a month's storm raged. 'At the termination of it, between the burn of Boyndie and Greenside of Gamrie—a distance of about nine miles'—(he counted) 'nearly sixty of these birds lying dead.' Great numbers were also found dead in the fields throughout the country. For heavy records of similar occurrences see also *Zoologist*, 1844, 1862; and *Inverness Courier*, December 16th, 1846. Among many localities where these birds were picked up we may name Gamrie, Banff, Pitgaveny, Hopeman, Duffus (all in 1879); and, whether it came from the east or west coast of Scotland, one was found by the shore of Loch Laggan, and has been preserved by the landlord of Loch Laggan Inn, as he informed Harvie-Brown. We only instance the above amongst many records.

These birds do not seem to be very regular migrants, or, at least, few are procured, as they do not figure very largely in Macleay's lists.

The heavy gales and severe cold of the winter of 1894-5 caused a regular irruption of Little Auks to the east coasts of the British Isles, in which our present area largely participated. We have no adequate means of judging of their numbers, as those recorded or sent in to local birdstuffers for preservation form a comparatively small item of the great quantities of birds seen either living or dead. It is quite reasonable to suppose that the earlier gales from the north and north-east first drove these little birds from their higher winter quarters to lower latitudes, and once there, the furious gale of the 6th and 7th January forced them nearer inshore, those of the 12th or thereabouts completing their ruin.

The first to be included in the list was from Nairn on January 12th; then one was sent from Kinbrace on the 16th; after that Messrs. Macleay and Son, on the 19th, received birds from Beauly, Nairn, Grantown on Spey, Clachnaharry and Kinmylies (Inverness), and Kessock. On the 22nd another consignment was received by the same firm from Kildonan (Sutherland), and the following Ross-shire localities:—Invercarron, Balnagown, Fearn, Alness, and the Black Isle; others were sent in later, the last being one at Inverness on February 9th.

Mr. Brown, birdstuffer, Forres, received fourteen Little Auks that were picked up between Nairn and Burghead, between the 6th and 18th of January; also two from Sutherland; but he does not mention the locality for these latter.

The last one of which we have a record for our area was picked up by W. Houstoun, Esq., amongst some cabbages in the garden in Kintradwell on Sunday, April 28th—a very late date.[1] This gentleman informed us that there were numbers of these birds lying dead along the shore during the early winter storms, while others again were found alive. A punter also told us that there were many Little Auks swimming about in the more inland part of the Moray Firth.

From the distance inland at which many of the birds were picked up, it is evident that they must have been driven before the wind at a great height.

Judging from the distribution of the few that were obtained on the west coast, it appears that the Great Glen offered a clear way for their flight, and was used by the Little Auks as the line of their enforced migration, because few were got at any point north of where it enters the western sea. Only one bird is recorded from any place along the glen, viz., at Fort William, and from this it appears that the greater number of those that attempted to cross the land to the north of this line perished on the road, either from losing their way or from being hindered by the height of the intervening land. Few of these would ever be seen by man, because during the time they would be on the move no human being could have been out far on the hills on account of the severe weather, gales, and deep snow. Now, those that struck the Great Glen would have absolutely no hindrance except the weariness of the long journey, as they could see plenty of water under them the whole way, and this undoubtedly accounts for what Mr. John Paterson says in his 'Notes on the Irruption of Little Auks in the Winter of 1894-95 on the West Coast of Scotland,' p. 4, where he writes as follows :—

'Dr. J. F. Gilmour writes from Port Ellen, Islay, that "they seemed to grow common all at once everywhere on the coast (of Islay ?), and even far inland."' The nearest approximate dates given are the end of January and the beginning of February, which are late ones, but more exact particulars might make their advent on the west coast somewhat earlier perhaps. We are indebted to the author of the paper just mentioned, and also to Mr. Eagle-Clarke, for much of the foregoing information extracted from their papers on this subject.

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[1] Vide *Annals of Scottish Natural History* for April 1895, where a map and chronological list of specimens for Scotland are given.

Fratercula arctica (*L.*). Puffin.

Local Name.—Tammie Norrie.

Less numerous off the north coast than the other sea-birds; not very common about Findhorn Bay, though Brown has several times met with it there in winter.

The Puffin breeds in comparatively small numbers—yet in thousands—at Troup Head (George Sim). Inland it is an accidental visitor. One was caught alive by the Cabrach postman, during a severe snowstorm, at the roadside near Belcherrie, and is stuffed, and now in the possession of Mr. Grant of Beldornie. It is not necessary to record other occurrences, except, perhaps, one other on the same day and in the same valley. Dr. J. O. Wilson writes:—'On this very day—18/viii/91—I saw a Puffin in confinement at Scott's Hospital, Huntly. The Governor found it amongst his poultry, and was under the impression that some boy had brought it from the sea-side on "the holiday," and had either lost it or set it at liberty.' We also heard of this bird when at Huntly in August 1891.

Family **COLYMBIDÆ.**

Colymbus glacialis, *L.* Great Northern Diver.

Local Name.—Ammer or Emmer Goose.

Though not known to breed in the British Isles, this bird occurs at times in inland situations in summer. We ourselves shot a fine male (?) in full summer plumage on the Brora in May 1877. Another was got at Glenquoich in June 1880 (Macleay). It is not a very rare bird on the east coast in winter and spring, though not nearly so abundant there as on the west.

Edward says:—'Some seasons pretty plentiful. Splendid specimens are procured, but they are generally immature.' There is one in fine summer plumage, and others in winter plumage in the collection in Duff House. The summer-plumaged bird was caught in a net at sea; "all were got off the Banff coast" (Mowat, keeper, *viva voce*), and there are various other records at Forres and along the coast of birds shot or caught in salmon nets.'

Colymbus arcticus, *L.* **Black-throated Diver.**

This bird is often called the Great Northern Diver.

A common species in the extreme north of our area, but by no means numerous south of the Great Glen. In Sutherland it is abundant, and also in the neighbourhood of Invergarry, but from what Mr. Malcolm tells us this is rather a recent extension. He says:—'Nearly every loch in the district holds a pair or two of these birds every year now, but formerly Loch Lundy was the only loch they visited. They breed.' We have ourselves seen them both on Loch Lundy and other lochs in the vicinity.

Of its breeding range south of the Ness we have not the very fullest data. From 1845 to about 1851 the Black-throated Diver bred regularly at Lochandorb, as we are assured by Lewis Dunbar. We know it breeds at Loch Ruthven, whence we have seen the eggs, and we have ourselves seen the birds upon the west end of Loch Errochd, upon the extreme borders of our present area. St. John remarked that this species bred on Lochandorb, and in no other loch in the district. Another locality for it south of the Great Glen is Loch Knockie. One in full summer plumage, and others in winter plumage, are in Duff House collection—'all killed off the coast' (*auct.* Mowat, gamekeeper). It occurs occasionally in Findhorn Bay; one obtained there in 1855 was sent to the Dalvey Museum. The species is not very abundant, though young birds occur in winter.

Brown of Forres writes, under date of 14/v/95:—'As I am writing, a fine specimen of a Black-throated Diver has just come to hand. Strange to say, it is from the mid station (salmon-net station), between Findhorn and Burghead. For the last fifteen years they have been caught at that station. I have never seen one which was obtained on any other part of the coast.'

Colymbus septentrionalis, *L.* **Red-throated Diver.**

A fairly common species in summer in the north part of our area, though by no means so abundant as the Black-throat; in the winter, however, this is reversed. Mr. Malcolm says of this species about Invergarry:—'Not quite so numerous as the Black-throated—still a good few—they also breed.'

Curiously the *O.S.A.* is utterly silent as to any species of Diver (*Colymbus*) in Moray.

Edward says:—'Winter visitor in about equal numbers with the last.' Specimens are in the Banff Museum in winter plumage. Mr. George Sim writes:—'In so far as the north-east coast is concerned, there are 1000s (*sic*) of Red-throated Divers for one of the Black-throated species. In fact I have only seen the Black-throat a few times in the course of twenty-eight years, whilst Red are to be seen cast up on the beach, and are also shot, all along the seaboard, from Bervie to Banff.'

There can be no doubt Mr. George Sim's version is correct as to the comparative numbers of Black- and Red-throated birds.

Hinxman, when residing at Inchrory, in Upper Glen Avon, in June and July 1893, informed us that the gamekeeper there (Mackenzie) told him that nine or ten years previously, a pair of Divers—identified by one of the party then at Rothiemurchus Lodge, as *Colymbus septentrionalis*—frequented Loch Mhic ghillie Chaoille in Glen Eunach during the summer, and probably bred there. Hinxman adds:—'I never heard before of any Colymbi in Strathspey,' and we may add—neither have we to date of the Appendix, December 6, 1895), though the last-mentioned species certainly *has bred* still farther south than the Cairngorms.

Family **PODICIPITIDÆ**.

Podicipes cristatus (*L.*). Great Crested Grebe.

A very rare bird in any part of Moray. Mr. Jennings has only met with a solitary specimen on the Dornoch Firth. An immature bird was killed on the Spey by Rev. R. W. Duff Orton in 1851 (*Fauna of Moray*, ed. 1889, p. 54). See *Analysis under Species.*

Podicipes auritus (*L.*). Sclavonian Grebe.

A rare visitor to our north coast. Mr. Jennings remarks that it is an uncommon winter visitant to the Dornoch Firth. St. John, too, calls it rare, but he had seen the birds both on Loch Lee, Loch Spynie, and the Spey. Mr. Sim of Aberdeen tells us that a Sclavonian Grebe was killed on March 9th, 1881, and sent to him from the parish of Glass. Two were got at Dunphail on September 10th, 1890.

One is recorded as having been killed in Findhorn Bay in

1879; one at Calcots in 1876; one at Lossiemouth in 1876, and another there in 1878 (*Fauna of Moray*).

Young birds are common on the coast in winter A fine old male was caught in a salmon net, and is now in Brown's shop at Forres, but such old birds are rare.

Podicipes nigricollis (*Brehm*). **Eared Grebe.**

On the 22nd January 1861 Messrs. Small and Son received an Eared Grebe in the flesh from Morayshire.

Podicipes fluviatilis (*Tunstall*). **Little Grebe.**

These birds are not particularly numerous in the north of our area, though by no means rare, hill-lochs not often being suitable for them to breed in. They occur, however, in most suitable places, such as about Dornoch, near Tain, and about Invergarry. They come down to the quiet sea-lochs in winter, and are then quite common about the Mound.

Little Grebes were numerous on Loch Spynie a few years ago, but in May 1885, on the occasion of a visit paid to that famous and classic haunt of wild fowl, we were told that only one nest was known to Captain Dunbar-Brander or to Jock Phin his keeper. Pike are blamed for extirpating them.

Little Grebes are not rare around Rothiemay, especially on the reaches above Banff and Alvah Bridge. They are seen also on the sluggish reaches of the river Isla, near Grange station, and on Long Loch, near Keith, and elsewhere, and are found on more rapid water in winter. See *Analysis under Species.*

Order TUBINARES.

Family PROCELLARIIDÆ.

Fulmarus glacialis (*L.*). **Fulmar.**

A dark variety of the Fulmar was shot at Invergarry in 1885 (Macleay). Another specimen was picked up dead on the Old Bar of the Findhorn after a north-east gale, on March 18th, 1886; it was a male in grey plumage. In Mr. Norman's notes to Dr. Gordon there is this entry :—'Several, Old Bar,' 1881.

A Fulmar Petrel was killed by a golf-ball struck by Mr. G. Innes on the Nairn golf-course; it was entered in the *Northern Chronicle* of September 13th, 1894, as a gull, but we saw the bird in Mr. Macleay's shop, and identified it as a Fulmar. It is the more strange, as a Fulmar is a rare bird on the east coast, and it is still rarer to find it flying overland.

Edward finds a place for it, and says:—'Occasional winter visitor. One in my possession was knocked down by an oar several miles out at sea off Gamrie Head.'

[Puffinus anglorum (*Temm.*). Manx Shearwater.

Obs.—We have no record for this species in our area, but it may prove of some little interest to relate that a single bird occurred at Buchanness Lighthouse in May 1879. This is interesting only as negative, showing how very rarely it occurs on our north-east coasts.

[Of *Puffinus major* and *P. obscurus* Edward says:—'*Only winter Visitors*'!! Italics and interjections are ours.]

Procellaria pelagica, *L.* Storm Petrel.

Captain Ellice obtained a specimen on Loch Oich about the middle of November 1887.

Edward puts it down as a 'visitor, like the rest of its kind.' We may allow this to stand, as it is well known to be frequently driven inland by storms, and cast upon the sea-shore all along the east coast.

The Storm Petrel is seen frequently in the Moray Firth. Martin (MS.) instances Burghead; at Inverness in numbers in 1842-43 (G. Anderson). It has been observed in great abundance within the last few years.

Brown considers it very rare. He found one in the winter of 1879, frozen to death, and sticking to a telegraph-wire at Burghead Railway Station.

Class 3. REPTILIA.

MUCH requires yet to be done amongst Reptilia and Amphibia, especially in the districts north of the Great Glen, and generally throughout the areas which we have indicated as still deserving of greater attention in the future. South of the Great Glen considerable trouble has been taken, both as regards these and the micro-mammalia, specimens having been sent from many separate localities to Mr. Eagle-Clarke during the past few years, but here also—*i.e.* in this southern division of Moray—there still are many blanks in distribution to be filled up. Mr. Eagle-Clarke, who has revised this portion, will still be happy to receive and identify specimens from any parts of the North of Scotland.

Sub-class *SQUAMATA*.

Order **OPHIDIA**.

Family **VIPERIDÆ**.

Vipera berus, *L.* **Viper or Adder.**

Although so abundant in the Sutherlandshire portion of our area, the Adder becomes scarcer as we advance towards the south; indeed, we personally do not remember ever having seen one between the Dornoch Firth and the Ness.

St. John describes it as numerous in some of the drier banks and hills of Morayshire. From Edward's account, the Adder is extremely rare in Banffshire, he himself not having met with more than three or four specimens in all his long experience.

Phillips, however, designates it the commonest reptile in the north of Scotland. In Aberdeen, Banff, Moray, and Inverness, it is distributed over the hilly districts, and thence down to the close proximity of the sea-shore. Heldon Hill, near Elgin, is one locality. Those in the lower ground, or 'Laigh,' Phillip observes, 'are lighter in colour than those from Strathspey and the higher hills, adapting no doubt their colour to their surroundings. 'We had,' he continues, 'an Adder in our possession from Strathpeffer for a good many months, and its colour was nearly green, and although having the characteristic markings, the tint was not so deep.'

The Viper is found generally on moors and less-frequented parts of the hills (*Fauna of Moray*). 'Serpents' (*sic*) are found, but not abundantly, in the parish of Kilearnan (*New Statistical Account*, xiv. p. 65), Ross and Cromarty.' In 1892 we heard of them occurring in 'bunches' in old peat-stacks at Sluie[1] in Upper Glenlivet, and it is at present not uncommon in Glen Fiddich deer-forest, but, as usually is the case, less abundant on sheep-ground. Dr. Gordon informed us that Darnaway and the oak-woods had long been reputed habitats of the Viper, and he had seen specimens killed in a corn-field near the village of Urquhart, and from Mayen near Elgin.

Adders sometimes appear very early in the season. We remember finding two lying amongst some brackens in February when the ground was covered with snow.

Order **LACERTILIA.**

Family **LACERTIDÆ.**

Lacerta vivipara, *Jacq.* **Common Lizard.**

Local Name.—Heather Ask.

Common everywhere throughout our area, especially in dry heathery ground. A freshly killed female picked up by a correspondent at Invergarry had three living young ones inside her, with 'well-developed heads, legs, and tails, but no eyes.' They sometimes produce four young.

[*Obs.*—A specimen of this species was taken by Dr. Innes on the Culbin Sands in 1843, and is now in the Elgin Museum, and further distribution is quoted in the *Fauna of Moray* under the old name of *Lacerta agilis*, which now properly belongs to the Sand Lizard. The identity of this specimen has been rendered certain by an examination by Mr. Eagle-Clarke of the first recorded specimen.

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[1] Not to be confounded with a place of the same name on the river Findhorn.

The Common Lizard, as its scientific name implies, produces its young alive, while the Sand Lizard lays eggs. The former is usually found in moister places than the latter.]

Family SCINCIDÆ.

Anguis fragilis, *L.* Blind Worm.

Not rare in the east of Sutherland, though not nearly so common as the Viper.

St. John says he only once observed the species, though he was told it was common: the one he saw had been found floating down the river Findhorn.

Edward says that though very rare in Banff, it is more abundant than the Adder—a statement the correctness of which is extremely open to doubt.

Dr. Gordon says the Blind Worm occurs on the moors and less frequented hills, and his son found a specimen on the Findhorn between Sluie and Logie on 5th September 1890, which he presented to the Elgin Museum in 1892.

Phillips, who has paid considerable attention to the Reptilia of his native district, writes us that the Blind Worm, or Slow Worm (*Anguis fragilis*), is rare in the North of Scotland; but they occur in widely separated areas, showing that their distribution is probably much more general than actually ascertained. Another from the Braes of Gight (Dee), just over our watershed, is also in the Elgin Museum.

Order CHELONIA.

Family CHELONIDÆ.

Thalassochelys caretta (*L.*). Logger-headed Turtle.

A specimen, under the name of the 'Ringed-back Turtle (*Testudo caretta*),' is recorded by Edward as having been captured in a salmon-net at Greenside, a few miles east of Macduff, and was presented to the Banff Museum by the Earl of Fife.

The species is of wide range, being found in tropical and subtropical seas, including the Mediterranean, and has been captured on the Devonshire coast.

Class 4. AMPHIBIA.

Order **BATRACHIA URODELA.**

Family **SALAMANDRIDÆ.**

Molge[1] cristata (*Laur.*). **Great Crested Newt.**

The Crested Newt occurs not uncommonly throughout the whole of our area. Dr. Gordon says that this species is less common than the Smooth Newt (*Fauna of Moray*). It is found close to Abernethy (*fide* Rev. W. Forsyth, D.D.), and Edward records it from Banff.

[**Molge vulgaris** (*Schneid.*). **Smooth Newt.**

Said to be not uncommon in Sutherland, and to occur throughout Moray, though it is less frequent than the Crested Newt (Dr. Gordon). Edward records it from Banff. Mr. Eagle-Clarke has received many newts from Sutherland, through the kindness of Sheriff Mackenzie, but has received nothing except the Palmated species. This species has been much confounded with the next throughout most parts of Scotland.]

Molge palmata, *Latr.* **Palmated Smooth Newt.**

This is the common and universally distributed Scottish species. It is found on the Lossie; at the Mill of Birnie; and on the moors. More frequent than *T. punctatus* (=*M. vulgaris*) in the flat of Moray' (*Fauna of Moray*, ed. 1889, p. 38), and in a pool by the side of the Lossie at Killas. Edward says it occurs in Banff, and Mr. Eagle-Clarke has received specimens from the Deveron valley in that county, sent by Mr. T. Tranter.

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[1] *Molge* is now the accepted generic name for the Newts.

In May 1893 Mr. W. Evans found this species occurring in a little pond near Aviemore. Sheriff Mackenzie sent a score or so of Newts on various occasions from some pools in Ben Bhraggie, near Golspie, Sutherland, in April 1894, to Mr. Eagle-Clarke, who identified them as being of this species.

Referring to Newts generally, Edward says:—'They are all found in pools and ponds more or less throughout our whole district. They are also got on land at times, beneath stones, amongst grass, and at the roots of bushes, and occasionally a good distance from water.

'Although their movements on land can never be compared with either that of the Green or Sand Lizard, their activity in the water is most astonishing, and their seeming caution and cunning when in the latter no less so. It is really surprising to see how cautiously and slowly they will either go along or climb the stem of an aquatic plant. They move step by step, as if they were actually measuring the exact distance, their small eyes ever on the alert, and glistening like little diamonds. There is a halt, and a look this and then that way. There is nothing in view. They therefore go on again a few more steps. Then comes another survey—this time a longer one. Still, nothing is seen, so away once more. No: only one step, when the head is slightly turned to one side. See, here comes a wee speck of a worm-like thing, twisting itself along at a noble rate. On it comes, the newt's eyes following it the while. Will it come to the very jaws of death of its own accord? Yes, see—the ask's forefeet are pressed to his side, and away he darts, and with his unerring accuracy snaps his prey.' —(Extract from *The Reptiles of Banff*, by Thomas Edward, A.L.S.)

Order **BATRACHIA ANURA.**

Family **BUFONIDÆ.**

Bufo vulgaris, *Laur.* Common Toad.

Common, and generally distributed. Mr. James Laidlaw,[1] writing from Coul in 1833, has the following notes:—

'In the wood west from Coul there is a cart-road crossing towards the parks. On this road, which is bare of grass or mosses, thousands of young Toads were constantly to be seen for four or five days. They were about the size of horse-beans, and black, and all going one way towards the large wood of Scottish firs. On every square foot, as correctly as I could judge, there were not under six of these young reptiles, often far more, and this continued for many days.'

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[1] See Appendix.

Family **RANIDÆ**.

Rana temporaria, *L.* Common Frog.[1]

Local Name.—Heath Frog (?).

The Common Frog. Generally distributed, and common.

In a note by Murdoch Matheson he mentions that on February 6th, 1888, Frogs came forth, the day being very mild, but it came on to frost, and they died in hundreds. They spawn about the middle or end of March, and judging from the whitish, dead look of the ova after a frost, a great deal of it must be wasted.

THE EXTINCT VERTEBRATE ANIMALS OF THE MORAY FIRTH AREA.

BY R. H. TRAQUAIR, M.D., LL.D., F.R.S.

ALTHOUGH Palæontology is essentially a part of Biology, it is, nevertheless, so intimately connected with Geology that the study of the fossil animals of a district necessarily presupposes a knowledge of the leading facts of the last-named science, as well as a special acquaintance with the geological structure of the region in question. The palæontologist dare no more be ignorant of geology than the zoologist of physical geography, and conversely the geologist ought to be interested in, and to possess a certain amount of knowledge of palæontology, to the facts of which, in their relation to stratigraphy, he ought to give due importance and weight. It is, however, unfortunate that only too many of our geologists seem desirous of studying the formation and arrangement of the rocks of the earth's crust, with as little reference as possible to the fossil remains which they contain!

As regards the first condition, I must presume a knowledge of the elements of geology on the part of the readers of this essay; as regards the second, I should advise an inspection of the last edition of Sir A. Geikie's Geological Map of Scotland. Space will not permit of my entering into any detailed account of the geology of the region comprised in the Moray Firth Basin; nor would that be desirable until the survey of the district, now in progress, by the Government geologists has been completed, and the results published in the form of official maps and memoirs. Of the maps, two are already published, namely, sheets 94 and 95.

The following is a list of the principal sources of information as to the geology of the fossiliferous rocks of the district already published:—

1. Murchison, R. I. On the Coal Field of Brora and some other Stratified Deposits in the North of Scotland. *Trans. Geol. Soc. Lond.* 2nd ser. Vol. ii. pt. 2 (1829) pp. 293-326.
2. Murchison, R. I. Supplementary Remarks on the Strata of the Oolitic Series, and the Rocks associated with them in Sutherland, Ross, and the Hebrides. *Ib.* pp. 353-368.
3. Gordon, G. Letter addressed to Sir R. I. Murchison, noticing the Occurrence of Lias on the Southern Side of the Moray Firth. *Proc. Geol. Soc. Lond.*, vol. i. p. 394.
4. Martin, J. On the Geology of Morayshire. *Trans. Highl. and Agric. Soc. of Scotland*, vol. xi. pp. 417-446.
5. Malcolmson, J. G. On the Relations of the Different Parts of the Old Red Sandstone, in which Organic Remains have been recently discovered in the Counties of Moray, Nairn, Banff, and Inverness (1839). *Qu. Journ. Geol. Soc. Lond.*, vol. xv., 1859, pp. 336-351.
6. Miller, Hugh. *The Old Red Sandstone, or New Walks in an Old Field.* Edinburgh, 1841, and subsequent editions.
7. Duff, P. Geology of Moray. Elgin, 1842.
8. Robertson, A. Note of the Occurrence of Beds containing Freshwater Shells in the Coal Field of Brora, Sutherlandshire. *Proc. Geol. Soc.*, vol. iv., 1846, pp. 173-174.
9. Robertson, A. On the Wealden Beds of Brora, Sutherlandshire, with Remarks on the Relations of the Wealden Strata and Stonesfield Strata to the rest of the Jurassic System, and on the Marine Contemporary of the Wealden Series above the Portland Stone, *Qu. Journ. Geol. Soc.*, vol. iii., 1847, pp. 113-128.
10. Cumming, J. G. On the Tertiary Deposits of the Moray Firth and the Great Caledonian Valley, with a Brief Notice of the Older Formations. *Qu. Journ. Geol. Soc.*, vol. vi., 1850, pp. 10-17.
11. Robertson, A. Synopsis or Index of the Geology of Moray, published in Anderson's Guide to the Highlands. Edinburgh, 1851, pp. 344-349.
12. Brickenden, L. On the Occurrence of the Boulder Clay in the Limestone Quarry, Linksfield, Elgin. *Qu. Journ. Geol. Soc. Lond.*, vol. vii., 1851, pp. 289-292.

13. BRICKENDEN, L. Notice of the Discovery of Reptilian Foot-tracks in the Old Red Sandstone or Devonian Strata of Moray. *Qu. Journ. Geol. Soc.*, vol. viii., 1852, p. 97.
14. MILLER, HUGH. Cruise of the Betsy, and Rambles of a Geologist. Edinburgh, 1858, and subsequent editions.
15. MILLER, HUGH. Sketch Book of Popular Geology. Edinburgh, 1859, and subsequent editions.
16. GORDON, G. On the Geology of the Lower or Northern Part of the Province of Moray; its history, present state of inquiry, and points for future examination. *Edin. New Phil. Journ.*, new ser., vol. ix., 1859, pp. 14-58.
17. HARKNESS, R. On the Yellow Sandstones of Elgin and Lossiemouth. *Brit. Assoc. Rep.*, Aberdeen, 1859, Proc. Sect. pp. 109-110, published 1860.
18. MOORE, C. On the so-called Wealden Beds at Linksfield, and the Reptiliferous Sandstones of Elgin. *Qu. Journ. Geol. Soc.*, vol. xvi., 1860, pp. 445-447.
19. GORDON, G., and JOASS, J. M. On the Relations of the Ross-shire Sandstones containing Fossil Footprints.
20. HARKNESS, R. On the Reptiliferous Rocks and Footprint-bearing Strata of the North East of Scotland. *Qu. Journ. Geol. Soc. Lond.*, vol. xx., 1864, pp. 429-443.
21. MURCHISON, R. I. Siluria. Fourth edition, London, 1867, p. 267.
22. JUDD, J. W. The Secondary Rocks of Scotland, First Paper. *Qu. Journ. Geol. Soc.*, vol. xxix., 1873, pp. 97-197.
23. GEIKIE, A. On the Old Red Sandstone of Western Europe. *Trans. Roy. Soc. Edin.*, vol. xxviii., 1878, pp. 345-452.
24. JUDD, J. W. On the Relationship of the Reptiliferous Sandstone of Elgin to the Upper Old Red Sandstone. *Proc. Roy. Soc. Lond.*, vol. xxxix., 1886, p. 394.
25. PHILLIPS, J. G. The Elgin Sandstones. *Brit. Assoc. Rep.* Aberdeen, 1885.
26. GORDON, G. The Reptiliferous Sandstones of Elgin. *Trans. Geol. Soc. Edin.*, vol. vi., 1893, pp. 241-245.
27. MACKIE, W. Sand Grains, and what we may learn from them. Elgin, 1894.

Only a very few words in the way of summary will suffice for our present purpose. By far the greater part of the Moray Basin is formed of ancient crystalline rocks, in which, of course, no trace of organic remains can reasonably be expected, and with two exceptions it is only towards the sea that these are overlaid by fossiliferous strata of later date.

Of these later formations the most extensive is the Old Red Sandstone (Devonian) which stretches round the shores of the Moray Firth from Buckie to near Helmsdale, but is most extensively developed in the south-west corner in the districts of Inverness, the Black Isle, and Dingwall, and running into the Great Valley for some distance. East of Buckie there are two outlying or detached masses, one at Cullen, another and larger on the coast between Aberdour and Gamrie, and extending also for a considerable distance southwards. Two other detached masses occur, however, far inland,—one at Strathbogie, another at Tomintoul.

The Old Red Sandstone of this region lies, of course, unconformably on the crystalline schists, and is divided into two stages, upper and lower, which are also unconformable to each other.

The lower beds form part of the great Orcadian Series so extensively developed in Caithness, Orkney, and Shetland, and which was classed by Murchison as the 'Middle' Old Red Sandstone. More recently (23) Sir A. Geikie has maintained their contemporaneity with the Lower Old Red of Forfarshire, Central Scotland, and Western England, but that is a question which need not be here discussed. Suffice it to say that the fossil fish-fauna of the Orcadian Series is, as we shall presently see, very different from that of the Lower Old Red of Great Britain to the south of the Grampians.

The Upper Old Red of the Moray Firth area has, however, a palæontological facies similar to that of the corresponding strata of other parts of Scotland, which pass up conformably into the Lower Carboniferous. Here it is seen principally in the districts of Elgin and Nairn, reappearing farther north about Tarbet, Tain, and Dornoch.

Overlying the Upper Old Red there is in the Elgin district a large patch of yellowish and greyish sandstones, extending northward to the sea and forming the cliffs on the coast between Burghead and Lossiemouth. These beds, the well-known Reptiliferous Sandstones of Moray, were formerly considered to be part of the Upper Old Red, but nowadays the affinities of their enclosed reptilian remains have convinced the overwhelming majority of geologists that they are of Triassic age. According to Professor Judd (22) a patch of similar rocks is to be seen near Golspie underlying the base of the series of Jurassic strata which extends along the coast to beyond Helmsdale.

Rising higher in the geological series, certain patches on the south side of the Moray Firth, and notably one at Linksfield near Elgin, have been ascribed to the Rhætic formation, but the remarkable circumstance is that these seem to occur *in* the boulder clay, and consequently to be in all probability ice-transported masses. That at Linksfield contains vertebrate fossils which will hereafter be noticed. Transported boulders, referable to the Lower Lias, are also found at Kaim and Inverugie in Elginshire, and others of Middle Liassic age at Loch Spynie and Lhanbryde. On the north side of the Moray Firth a long narrow patch of secondary rocks *in situ* extends along the coast of Sutherland from Golspie in the south-west to Green Table Point beyond Helmsdale on the north-east, a distance of about eighteen miles. This patch, or belt, attains a breadth of nearly two miles at Brora, but becomes very narrow beyond Kintradwell, where it is interrupted, and is again interrupted at Helmsdale. The geological sequence of the beds composing this patch ascends towards the north-east, so that from Golspie to Helmsdale we pass in succession over strata of Triassic, Liassic, Lower Oolitic, and Upper Oolitic age (Judd).

In conclusion, it is to be noted that the mapping of the older rocks in the Elgin district is rendered difficult by the thick covering of drift by which the relations of the subjacent strata is greatly obscured.

Some of the authors of geological works and papers in the list given above have also, by their labours as collectors, contributed vastly to our knowledge of the fossil vertebrate fauna of the Moray Firth area. Such names are those of Hugh Miller, whose popular descriptions of Old Red fishes are also classical, the Rev. G. Gordon, Dr. Malcolmson, and Mr. Patrick Duff; while as field workers in this line the names of Lady Gordon Cumming of Altyre, Mr. Stables of Nairn, Rev. Dr. Joass of Golspie, and Mr. J. Grant of Lossiemouth must not be forgotten. Still more recently Mr. William Taylor of Lhanbryde has taken up the work with enthusiasm and success. On the other hand, special or technical descriptions of the vertebrate fossils have principally been furnished by L. Agassiz, Sir Philip Grey-Egerton, Prof. M'Coy, Prof. Huxley, Mr. E. T. Newton, Mr. A. S. Woodward, and myself.

The following is a list of works and papers in which fossil vertebrata from this area are described, figured, or specially referred to:—

FISHES.

28. Agassiz, L. Recherches sur les Poissons Fossiles. Neuchâtel, 1833-43.
29. Agassiz, L. Monographie des Poissons Fossiles du vieux Grès rouge. Neuchâtel, 1844.
30. Owen, R. Odontography. London, 1841.
31. Grey-Egerton, P. de M., and Miller, Hugh. On Pterichthys. *Qu. Journ. Geol. Soc.*, vol. iv., 1848, pp. 302-314.
32. M'Coy, F. Systematic Description of the British Palæozoic Fossils in the Geological Museum of the University of Cambridge. London, 1851-55.
33. Pander, C. H. Ueber die Placodermen des devonischen Systems. St. Petersburg, 1857.
34. Grey-Egerton, P. de M. Remarks on the Nomenclature of the Devonian Fishes. *Qu. Journ. Geol. Soc.*, vol. xvi., 1860, pp. 119-136. Contains also notes on *Coccosteus*, by Hugh Miller.
35. Pander, C. H. Ueber die Saurodipterinen, Dendrodonten, Glyptolepiden und Cheirolepiden des devonischen Systems. St. Petersburg, 1860.
36. Huxley, T. H. Preliminary Essay upon the Systematic Arrangement of the Fishes of the Devonian Epoch. *Dec. Geol. Survey*, x. 1861.
37. Grey-Egerton, P. de M. *Cheiracanthus latus*, in *Dec. Geol. Survey*, x. 1861.
38. Huxley, T. H. Illustrations of the Structure of the Crossopterygian Ganoids. *Dec. Geol. Survey*, xii., 1866.
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It is also to be noted that much valuable palæontological material relating to the fishes of this area is to be found both in Hugh Miller's *Old Red Sandstone* (6) and Patrick Duff's *Geology of Moray* (7), already quoted under the head of Geology. In fact, Miller's restored figures of *Pterichthys* and *Osteolepis* are much more accurate than those given by Agassiz three years later.

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FISHES OF THE LOWER OLD RED SANDSTONE (ORCADIAN SERIES) OF THE MORAY FIRTH BASIN.

The fishes of the Orcadian series occur in certain shaly 'fish-beds, which crop out in various localities along the borders of the Moray Firth. Beginning at the north, the following localities may be enumerated:—

Geanies; Edderton; Cromarty; Nairnside, near Inverness; Hillhead, near Dalcross; Lethen Bar and Clune, near Nairn; Dipple, Speyside; Tynet Burn, near Fochabers; Gamrie, near Banff.

The fishes themselves are contained in limestone nodules, and those from different localities display considerable difference in colour and mode of preservation, so that the initiated eye can generally guess pretty safely the place from which a given specimen has been derived. For instance, the Cromarty and Gamrie fishes are black upon a greyish stone; those from Lethen and Clune are white, stained more or less with red oxide of iron upon a purplish grey stone; while the most beautiful are those from Tynet, which are so sharply stained as to appear nearly crimson on a stone of a pale (sometimes slightly greenish) cream colour. Again, the external markings of the scales are usually well seen in specimens from Cromarty and Gamrie, but not so in those from Lethen, Clune, and Tynet. It may also be imagined that the fishes found in the black fissile Orkney flags look at first sight somewhat different in detail from those preserved in the Moray Firth nodules. These deceptive differences in mode of preservation, along with post-mortem distortions of shape, have been in the past a fruitful source of unnecessary multiplication of species, the very same fishes having, in many cases, received different names according to the localities in which they were found. However, in 1888 (44) I showed that the number of species must be very much reduced, and that one fish-fauna characterised not only all the above enumerated localities along the Moray Firth coast, but also the fish-bearing schists of the Orkney Islands. Most of the species occur also in Caithness.

Class PISCES.

Sub-class *ELASMOBRANCHII.*

Order **ACANTHODEI.**

Family **DIPLACANTHIDÆ.**

Genus *DIPLACANTHUS*, *Agassiz.*

Diplacanthus striatus, *Agassiz*, 1844.

SYN. *D. striatulus*, Agassiz ; *D. crassispinus*, Agassiz ; *D. gibbus*, M'Coy.

(Restored figure, Pl. ii. fig. 1.)

Especially common at Cromarty, but also occurring at Lethen, Clune, Tynet Burn, and Gamrie. Those from Lethen and Tynet were distinguished by Agassiz under the name of *D. striatulus*, but they are undoubtedly identical with the Cromarty types, except in colour and mode of preservation. *D. crassispinus*, Agass., and *D. gibbus*, M'Coy, from the Orkney flags, are also synonyms. *D. striatus* occurs also at Achanarras in Caithness.

Diplacanthus tenuistriatus, *Traquair*, 1894.

Rare. I only know of three specimens, all of which are in the Museum of Science and Art, Edinburgh. One of these, from Cromarty, is in the Hugh Miller collection, the other two were found at Gamrie by Mr. Jex, collector to Mr. R. F. Damon of Weymouth.

Genus *RHADINACANTHUS*, *Traquair*, 1888.

Rhadinacanthus longispinus (*Agassiz*), 1844.

SYN. *Diplacanthus longispinus*, Ag. et cet. auct. ; *D. perarmatus*, M'Coy.

Distinguished by its long slender spines and its sharply and beautifully sculptured scales. *Diplacanthus perarmatus*, M'Coy, from Orkney, belongs unquestionably to the same species, which also occurs at Achanarras in Caithness.

In the Moray Firth area it is rather rare, except at Gamrie, where many fine specimens have been collected. The type specimen is however from Cromarty, and it also occurs at Lethen and Tynet.

A closely allied species, *R.* (*Diplacanthus*) *horridus*, has been described by Mr. Smith Woodward from the Upper Devonian of Canada.

Family **ACANTHODIDÆ.**

Genus *MESACANTHUS*, *Traquair*, 1888.

Mesacanthus pusillus, *Agassiz*, 1844.

SYN. *Acanthodes pusillus*, Ag. et cet. auct.

In 1888 (44) I instituted the genus *Mesacanthus* for the *Acanthodes Mitchelli* of Egerton from the Forfarshire beds, on account of the presence of a pair of small spines intermediate between the pectorals and ventrals in that species. These intermediate spines have not been as yet detected in *pusillus*, but I have placed it along with *Mitchelli* on account of its great similarity in form, while the very small size and imperfect preservation of the specimen renders it difficult to come to a definite conclusion as to the entire absence of the spines in question.

Cromarty, Lethen Bar, and Tynet Burn, but not abundant.

Genus *CHEIRACANTHUS*, *Agassiz.*

Cheiracanthus Murchisoni, *Agassiz*, 1835.

SYN. *Ch. minor*, Ag.; *Ch. microlepidotus*, Ag.; *Ch. lateralis*, M'Coy; *Ch. pulverulentus*, M'Coy.

(Restored figure, Pl. ii. fig. 2.)

Agassiz distinguished the specimens from Lethen from those occurring at Gamrie, giving the name of *microlepidotus* to the former; but there is no difference save in mode of preservation. Nor can *Ch. minor* Ag., *lateralis* M'Coy, and *pulverulentus* M'Coy, all from Orkney, be distinguished from the *Murchisoni* of the Moray Firth beds. The same species occurs also at Achanarras.

Common at Cromarty, Lethen, Clune, and Gamrie; less so at Tynet Burn.

Cheiracanthus latus, *Egerton*, 1861.

Common at Tynet Burn, and also occurring at Cromarty, Lethen, and Gamrie.

Sub-class *OSTRACODERMI.*

Order **ANTIARCHA.**

Family **ASTEROLEPIDÆ.**

Genus *PTERICHTHYS*, *Agassiz.*

Pterichthys Milleri, *Agassiz*, 1841.

SYN. *Pt. latus*, Ag.; *Pt. testudinarius*, Ag.; *Pt. cornutus*, Ag.; *Pt. latus*, Egert.

(Restored figures, Pl. i. figs. 1, 2, 3.)

Common at Cromarty, Lethen, and Gamrie; found also at Edderton and Tynet. Outside the Moray Firth area it is common in Orkney, and at Achanarras in Caithness.

Pterichthys productus, *Agassiz.*

Syn. *Pt. cancriformis,* Ag., 1844.

Found in the same localities as *Pt. Milleri.* I have suggested (49, p. 284) that the differences between the two forms may be of a sexual nature.

Pterichthys oblongus, *Agassiz,* 1844.

Also in the same localities as the two preceding, but not so common.

Sub-class *DIPNOI.*

Order **SIRENOIDEI.**

Family **CTENODONTIDÆ.**

Genus *DIPTERUS, Sedgw. and Murchison.*

Dipterus Valenciennesii, *Sedgw. and Murchison,* 1828.

Syn. *D. macropygopterus,* Sedgw. and Murch.; *D. brachygopterus,* Sedgw. and Murch.; *Polyphractus platycephalus,* Ag.; *Dipterus platycephalus,* Pander; *D. macrolepidotus,* Ag., *non* Sedgw. and Murch.

(Restored figure Pl. ii. fig. 3.)

Cromarty; Nairnside, near Inverness; Lethen Bar; Tynet Burn. Though abundant in the Caithness flags, *Dipterus Valenciennesii* is very rare in the Moray Firth nodules.

In the way of 'restoration' this interesting fish has not met with the best of treatment. Agassiz's figure (29, tab. E, fig. 1), so repeatedly copied into text-books, has scarcely the remotest resemblance to the creature in question. Pander's restoration[1] was an immense advance, a really faithful attempt to represent the facts of nature as he saw them, and is in truth much more correct than that given quite recently by Mr. Bashford Dean,[2] which is in many respects quite inaccurate. My present figure, Pl. ii. fig. 3, has been carefully taken from the best Caithness specimens in the Edinburgh Museum.

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[1] *Die Ctenodipterinen des devonischen Systems.* St. Petersburg, 1858. Tab. 2, fig. 1.

[2] *Fishes, Living and Fossil.* New York, 1895. Fig. 123.

Sub-class *TELEOSTOMI.*

Order **CROSSOPTERYGII.**

Family **HOLOPTYCHIIDÆ.**

Genus *GLYPTOLEPIS, Agassiz.*

Glyptolepis leptopterus, *Agassiz*, 1844.

SYN. *G. elegans*, Ag.; *Holoptychius Sedgwicki*, M'Coy.

Edderton; Cromarty; Lethen; Clune; Lethen Bar; Tynet Burn; Gamrie. Common. *Holoptychius Sedgwicki* of M'Coy from the Orkney flags is not distinguishable.

Glyptolepis approaches *Holoptychius* so closely that it has been reduced by Mr. Smith Woodward to the position of a sub-genus of the latter.

Family **RHIZODONTIDÆ.**

Genus *GYROPTYCHIUS, M'Coy.*

Gyroptychius microlepidotus (*Agassiz*), 1844.

SYN. *Glyptolepis microlepidotus*, Ag.; *Gyroptychius angustus*, M'Coy.

(Restored figure, Pl. iii. fig. 1.)

Its rounded scales misled Agassiz into placing this species with *Glyptolepis.* It is undoubtedly the same as M'Coy's *Gyroptychius angustus* from Orkney, and it was from Orkney specimens that Pander (35) produced his descriptions and figures, including the restoration which has been so repeatedly copied. I have endeavoured to give a more complete figure from examples occurring in the Moray Firth nodules.

Lethen Bar; Tynet Burn; Gamrie. Not very common.

Family **OSTEOLEPIDÆ.**

Genus *OSTEOLEPIS, Valenciennes.*

Osteolepis macrolepidotus, *Agassiz*, 1835.

SYN. *O. microlepidota*, Ag. (*non* Valenciennes, *non* Pander); *O. arenatus*, Ag.; *O. major*, Ag.; *O. brevis*, M'Coy; *Tripterus* and *Triplopterus Pollexfeni*, M'Coy.

(Restored figure, Pl. iii. fig. 2.)

The name *Osteolepis macrolepidotus* was first devised by Valenciennes for a fish from Caithness, the identity of which is, however, from the want of description or figure, left in considerable doubt. Agassiz's *O. macrolepidota* is the common Orkney species, from which his *arenatus* and *major* from the Moray Firth nodules are only distinguishable by mode of preservation. M'Coy's *Triplopterus Pollexfeni* and *Osteolepis brevis* from Orkney are certainly also synonyms of *O. macrolepidota*, Ag.

Agassiz's restored figure of *Osteolepis* (29, tab. E, fig. 2) was, like so many of his other reproductions, totally inaccurate, although very good ones had been previously published both by Hugh Miller (6, Pl. iv. fig. 1) and by Duff (7, Pl. ix. fig. 1). Miller's and Duff's restorations give in fact a better idea of the fish even than Pander's (35, Pl. ii. fig. 7), which to this day holds its own in the text-books, a figure of *O. microlepidota* which I gave in 1882,[1] having been passed over by the copiers unnoticed. The one which I now give of *O. macrolepidota* is the result of much careful comparison of specimens from many localities.

Common in the nodules at Edderton, Cromarty, Lethen Bar, Clune, Tynet Burn, and Gamrie, *O. macrolepidota* is one of the most abundant fishes of the Orcadian rocks of the Moray Firth area.

Genus *DIPLOPTERUS*, *Agassiz*, 1835.

(*Diplopterax*, M'Coy.)

Diplopterus Agassizii, *Traill*, 1841.

SYN. *D. macrocephalus*, Ag.; *D. affinis*, Ag.; *D. borealis*, Ag.; *D. gracilis*, M'Coy; *Gyroptychius diplopteroides*, M'Coy.

(Restored figure, Pl. iii. fig. 3.)

Orkney specimens of this fish were first named *D. Agassizii* by Traill,[2] afterwards *borealis* by Agassiz, while *gracilis*, M'Coy, from the same beds, is also obviously synonymous. The same species occurring at Lethen Bar was named *D. macrocephalus* by Agassiz, while he also distinguished those from Gamrie as *D. affinis*.

Cromarty (rare); Lethen Bar; Tynet Burn; Gamrie. Not a very common fish.

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[1] In Sir A. Geikie's *Text-Book of Geology*, London, 1882, p. 709, fig. *b*.

[2] *Trans. Roy. Soc. Edin.*, vol. xv. p. 89.

Incertæ sedis.

Order PLACODERMATA.

Genus *COCCOSTEUS*, *Agassiz.*

Coccosteus decipiens, *Agassiz*, 1844.

SYN. *C. cuspidatus*, Ag.; *C. oblongus*, Ag.; *C. microspondylus*, M'Coy; *C. trigonaspis*, M'Coy; *C. latus* (Ag.), M'Coy; *C. pusillus*, M'Coy; *C. Milleri*, Egert.

(Restored figure of skeleton, Pl. iv. fig. 1.)

There can be no doubt that there is but one species of *Coccosteus* in the Orcadian beds of the Moray Firth, namely, *C. decipiens* of Agassiz, which includes also the Coccostean remains from this region, to which the names *cuspidatus*, *oblongus*, and *Milleri* have been given. It is also the only species known from the Orkney beds, M'Coy's *microspondylus*, *trigonaspis*, and *pusillus* being certainly synonymous. The latter seems to be only a young form of *C. decipiens*, and must not be confounded, as has been the case, with *C. minor*, H. Miller, from the Thurso district.

Coccosteus decipiens is one of the commonest fishes in the Orcadian series of rocks, being abundant in all the fish-bearing localities of this horizon in the Moray Firth area, in Orkney, and also throughout Caithness, except in the John o' Groat's beds.

In Pl. iv. fig. 1, I have given a restored outline of the skeleton of this species, nearly the same as that which I have previously published (46, Pl. x. fig. 1), and without any attempt to delineate the outline of the body and dermal fins, as has been done by Mr. Smith Woodward in a drawing given in his 'Catalogue' (47, p. 282, fig. 44). Mr. Woodward has in his figure represented *Coccosteus* with a hypothetical caudal fin of a regular heterocercal form, but I venture to think that he is not justified in this by the condition of the vertebral column as we find it. Had *Coccosteus* possessed such a heterocercal tail we should expect to find the apophyses at the commencement of the fin on the hæmal aspect becoming suddenly much elongated, and the vertebral axis permanently directed upwards at this part, whereas, though these apophyses are indeed slightly longer and more vertical on the hæmal than on the neural aspect, they show no sudden or great elongation, nor does the notochordal axis present any constant upward bend. That *Coccosteus* possessed a vertical caudal fin-fold, which was slightly deeper below than above, is highly probable, but I fail to see any evidence of the existence of a heterocercal tail such as is shown in Mr. Woodward's figure.

Genus *HOMOSTEUS*, *Asmuss.*

(*Asterolepis*, Agassiz *pars*, *non* Eichwald.)

Homosteus Milleri, *Traquair*, 1888.

SYN. *Asterolepis*, Hugh Miller; *Asterolepis Asmusii*, J. Morris (*non* Agassiz).

(Outline of cranial and dorsal shields, Pl. iv. fig. 2.)

This great Coccostean, which formed the text to Hugh Miller's well-known work, *Footprints of the Creator, or the Asterolepis of Stromness*, is very rare in the Moray Firth region. In fact, I only know of one instance of its occurrence, namely, a head with dorsal plates *in situ*, from Hillhead quarry near Dalcross, which is in the collection of the Geological Survey of Scotland. It occurs in Orkney, but it is from the neighbourhood of Thurso, in Caithness, that the greater number of specimens have hitherto been obtained.

Order ACIPENSEROIDEI.

Family PALÆONISCIDÆ.

Genus *CHEIROLEPIS*, *Agassiz.*

Cheirolepis Trailli, *Agassiz*, 1835.

SYN. *Ch. uragus*, Ag.; *Ch. Cummingiæ*, Ag.; *Ch. curtus*, M'Coy; *Ch. macrocephalus*, M'Coy; *Ch. velox*, M'Coy.

(Restored figure, Pl. iii. fig. 4.)

Edderton; Cromarty; Lethen Bar; Clune; Tynet Burn; Gamrie.

Agassiz distinguished two species of *Cheirolepis* from the Moray Firth nodules, namely, *uragus* from Gamrie, and *Cummingiæ* from Lethen Bar, but the sole difference lies in the mode of preservation, the outer ganoine layer of the scales being shown in specimens from Cromarty and Gamrie, whereas in those from Lethen, Clune, and Tynet, it generally adheres to the matrix, and the external striated sculpture of the scales is consequently invisible. But both of these presumed species are identical with his *Ch. Trailli* from Orkney, and upon Orkney specimens M'Coy manufactured still other three supposed species, namely, *Ch. curtus*, *macrocephalus*, and *velox*. There is thus but one species of *Cheirolepis* known in Britain, and the only other one which has been obtained in the world at large is *Ch. Canadensis*, Whiteaves, from the Upper Devonian of Canada.

In looking back on this fish-fauna of the Orcadian series as occurring along the shores of the Moray Firth, we may first recall the list of species noted above to the mind of the reader. They are:—

Diplacanthus striatus, Ag.
,, *tenuistriatus*, Traq.
Rhadinacanthus longispinus (Ag.).
Mesacanthus pusillus (Ag.).
Cheiracanthus Murchisoni (Ag.)
,, *latus*, Egert.
Pterichthys Milleri, Ag.
,, *productus*, Ag.
,, *oblongus*, Ag.
Dipterus Valenciennesii, Sedgw. and Murch.
Glyptolepis leptopterus, Ag.
Gyroptychius microlepidotus (Ag.).
Osteolepis macrolepidota, Ag.
Diplopterus Agassizii, Traill.
Coccosteus decipiens, Ag.
Homosteus Milleri, Traq.
Cheirolepis Trailli, Ag.

As nearly all of these fishes reappear in the flags of Caithness and of Orkney, it is clear that those, along with the Moray Firth beds, form one great palæontological series, the Orcadian—supposed by Sir A. Geikie to have been deposited in the hypothetical 'Lake Orcadie' of the Devonian period.

Of this assemblage of species *not one* occurs in the Lower Old Red Sandstone of Forfarshire, or of any part of Great Britain south of the Grampians. But to enter into any discussion of the relative geological age of these beds would carry us far away from the scope of the present essay, which is only concerned with the fossil vertebrate fauna of the Moray Basin.

FISHES OF THE UPPER OLD RED SANDSTONE.

As the Upper Old Red strata lie unconformably on those constituting the Orcadian series, a considerable difference might naturally be expected in their fossil contents. So it is in point of fact—not one species is common to the two series of beds. Nevertheless, as in the lower beds, so here also in the upper—the prevailing fossils are fish-remains, and the general *facies* of these fish-remains still remains Devonian, and has not become Carboniferous. Though the Upper Old Red does graduate conformably up into the Lower Carboniferous system, palæontology still demands the separation of the two.

But more than this: we have in the Moray Firth district two distinct Upper Old Red fish-faunæ,—that of Nairn in the west, and that of Elgin in the east. This curious fact I discovered seven years ago when first engaged in collecting fossils from the quarries near Nairn. The large fish-plates which occur in these quarries had indeed been known for fifty years, but, like all the large fish-plates from the Upper Old Sandstone, had been, without further inquiry, ascribed by collectors and geologists to '*Pterichthys major*.' My interest was of course aroused when I found that the *Pterichthys major* of Nairn was a very different creature from that of Alves, and that indeed not one of the species of fish found in the sandstones of the one district reappeared in those of the other. No doubt this difference of fauna is due to a difference in relative age and position, but the stratigraphical relationship of the beds in question have not yet been elucidated, though we may hope that the forthcoming memoirs of the Geological Survey on this region may throw some light on the matter.[1]

FISHES OF THE NAIRN SANDSTONE.

The quarries in which this sandstone is or has been worked are those at Seabank, on the shore immediately to the west of the town of Nairn; Kingsteps, also on the shore, about a mile to the eastward; and Boghole, about five miles from the town in a south-easterly direction. Only at Kingsteps are operations being carried on at present, Seabank and Boghole not having been worked for many years.

The Kingsteps stone is mostly of a pale pink colour, but varies in tone from a greyish white to a pretty dark red; sometimes it shows dark red specks scattered over a paler ground-colour. It is fine-grained in texture, contains a considerable amount of calcite as a cement, the presence of which causes the stone to effervesce when touched with an acid, and to phosphoresce for a few seconds with a pale golden light when powdered and sprinkled on a hot shovel in the dark.[1] Micaceous partings occasionally occur, and in places the stone may be rendered useless by the inclusion of numerous lenticular pieces of shaly matter, usually of a dark chocolate colour.

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[1] Meanwhile Dr. Mackie of Elgin (27) has from a comparative microscopic investigation of the sand grains constituting their rocks, come to the conclusion that the Nairn sandstones are probably older than those of Alves and Elgin.

The fossil fish-plates which are found in this sandstone are stated by Dr. Malcolmson (5) to have been first discovered by the late Dr. Gregor of Nairn in the stones of an old wall. By far the greater number belong to one species, namely *Asterolepis maxima*, Agassiz sp.; and though a few other fishes are also represented, their remains are comparatively rare.

Class PISCES.

Sub-class *OSTRACODERMI.*

Order **ANTIARCHA.**

Family **ASTEROLEPIDÆ.**

Genus *ASTEROLEPIS*, *Eichwald*, 1840.

Asterolepis maxima (*Agassiz*).

SYN. *Coccosteus maximus*, Agassiz; *Pterichthys major*, Hugh Miller, *non* Agassiz; ? *Cephalaspis Gordoni*, Malcolmson.

(Restored figures, Pl. v. figs. 1, 2.)

I have published a minute description of this species, accompanied with figures, in the Palæontographical Society's volume for 1894, in which work I have fully explained the reason for following Pander in restoring Eichwald's name *Asterolepis* to the Pterichthyan genus for which it was originally proposed, and for adopting Asmuss's *Homosteus* for the great Coccostean which Hugh Miller, misled by a mistake on the part of Agassiz, described as the 'Asterolepis of Stromness.'

The detached body-plates of *Asterolepis maxima* are by far the commonest fossils found in the Nairn Sandstone; occasionally several plates are found in apposition, but though heads and 'arms' are also not uncommon, anything even approaching to the description of an entire fish is extremely rare. One nearly entire specimen, though wanting the pectoral appendages, is figured in my work above referred to.

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[1] I have also observed this 'phosphorescence' in many specimens of Old Red Sandstone from other horizons and localities. In all cases it is due to calcite.

It is also interesting to know that no remains of *Asterolepis* occur in any other bed or locality in Britain, nor is the genus known with certainty elsewhere except in the Upper Devonian of Russia, where detached plates of the allied *A. ornata* of Eichwald are common in one or two places, especially at Wenden in Livonia.

Sub-class *TELEOSTOMI.*

Order **CROSSOPTERYGII.**

Family **HOLOPTYCHIIDÆ.**

Genus *HOLOPTYCHIUS*, *Agassiz.*

Holoptychius decoratus (*Eichwald*), 1844.

SYN. *Sclerolepis decorata*, Eichw.

(Pl. vi. fig. 11, scale, natural size.)

Scales, one to two inches in diameter, rounded, thin; exposed area closely covered with small stellate tubercles, which towards the covered area tend to become abrupt behind, more gently sloping in front, the flattened sloping surface being marked with one or two strong sulci. At the junction of the exposed and covered parts of the scale is a small semilunar area of minute tubercles closely arranged in lines radiating forwards and outwards, such as is found in other species of *Holoptychius* and *Glyptolepis.*

Other Holoptychian remains attributable to this species, which space does not permit me to figure, are:—

A *mandible* of a short and deep contour, 6 inches in length and 1⅝ inch in depth, near the anterior extremity. There are no teeth preserved, and the external sculpture is lost by erosion.

A mandibular *internal dentary* bone with root and portion of shaft of a laniary tooth. The shaft of the tooth is broken off shortly above the base, but it evidently had a two-edged contour similar to that of the laniaries in *H. giganteus*, Ag. (=*Lamnodus biporcatus*, Ag.).

A *clavicle*, 3½ inches in length, showing an external ornamentation of minute wavy ridges.

Although these scales appear quite different from any hitherto found in Britain, I cannot distinguish them from certain Russian scales, of which there are specimens in the Edinburgh Museum from Wenden in Livonia. These scales have been figured and described by Rohon[1] as belonging to *Dendrodus biporcatus*, Owen, but although two-edged dendrodent (=Holoptychian) teeth, very closely resembling those from Scaat Craig, to which Owen gave that name, occur at Wenden in Russia associated with the scales in question, and probably belong to the same fish, it is quite another thing to identify that fish with the original '*biporcatus*' of Morayshire, which is, on the other hand, pretty certainly the same as *Holoptychius giganteus* of Agassiz.

Eichwald, however, in 1844,[2] described, and afterwards figured, a fragment of a Holoptychian scale from the banks of the Slawänka, under the name of *Sclerolepis decorata*, which, so far as I can judge without seeing the original specimen, belongs to the same species as the scales from Wenden, and consequently also to the same as those from Nairn. This scale has been referred to *Glyptolepis* by Pander (35, p. 63). Eichwald published two figures of this scale, one in 1846,[3] another in 1860,[4] of which the former is the one that most closely resembles the specimen under consideration, as in the latter the larger tubercles are represented as having a little tail or ridge running off from them posteriorly. The nature of the sculpture, as shown in both figures, nevertheless resembles that in the Nairn and Wenden scales so closely that I feel compelled in the meantime to refer them to the species *decoratus* of Eichwald.

Family **RHIZODONTIDÆ**.

Genus *POLYPLOCODUS*, Pander.

Polyplocodus leptognathus, *sp. nov.*

(Pl. vii. figs. 1 and 2.)

Equally rarely with the Holoptychian remains described above, there occur in the Kingsteps quarries fragmentary relics of a fish which, from the structure of its teeth, clearly belongs to the Rhizodont family. Before discussing its generic position, it will be better first to describe the remains themselves.

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[1] *Mém. Acad. Imp. Sci. St. Petersbourg*, vol. xxxvi., No. 14, 1889, p. 6, Pl. i. figs. 7, 8, Pl. ii. figs. 13, 15, 16, 17, 18, 20.

[2] *Bull. Soc. Imp. Nat. Moscow*, vol. xvii., 1844, p. 832.

[3] *Ibid.* vol. xix., 1846, Pl. x. figs. 16, 17.

[4] *Lethæa Rossica*, vol. i., 1860, Pl. lvii., fig. 7.

I have represented in Pl. vii. fig. 1, natural size, the most perfect of these mandibles which I have as yet obtained; others, more fragmentary, are in my private collection, some of which indicate a larger, others a smaller fish. In their anteriorly tapering form these mandibles differ somewhat from the under jaws of other members of the family, such as *Eusthenopteron*, *Rhizodus*, *Rhizodopsis*, etc., but the stumps of teeth which they show on their upper margins, both small and laniary, show a plicated structure of the base, which is unmistakably rhizodont in character. As this plicated structure is also common to most of the Stegocephalous Amphibia, one might almost imagine from the tapering form of the jaw here figured, that we had to do with a 'Labyrinthodont,' and not with a fish, but the arrangement of the larger and smaller teeth, along with the apparent construction of the mandible out of very numerous pieces, leaves no doubt in my mind as to the correctness of the position to which I have referred it. The margin of the jaw is set with an external row of small teeth, and internally to those are seen larger laniaries, one of which is exposed in the specimen figured, while in another example their stumps may be seen to occur in pairs, and to be slightly incurved. Unfortunately, none of the teeth are quite perfect, but, as far as can be seen, their shafts were rounded in transverse section and not two-edged. In no case is the external ornament of the bones of the jaw visible.

In Fig. 2 of the same Plate a rhizodont palato-pterygoid bone of a peculiarly elongated shape is depicted, and I feel no doubt that it belonged to the same species as the above described mandibles. It is seen from the convex palatal surface, and the greater part of the bone has splintered off, except at the extremities and along the margins. The bone itself measures 6½ inches in length, but as its anterior extremity is broken off, it must have originally been at least one inch longer. Along the anterior half of the lower margin are seen some remains of the roots of small rhizodont teeth which seem to have been borne, as I have shown to have been the case in *Eusthenopteron*,[1] above a row of narrow palato-marginal ossicles, of which two are distinctly enough seen

[1] *Geol. Mag.* (3), vol. x., 1893, p. 266.

to be marked off by sutures behind the middle of the bone, and not bearing any teeth in that part.

In the Holoptychiidæ, Rhizodontidæ, and Osteolepidæ (Rhipidistia, Cope, *emend.* Smith Woodward) the hard palate is formed by one large bone, extending from the quadrate articulation of the jaw behind to the bones in front, to the lower and outer margin of which is articulated in *Eusthenopteron* a row of narrow tooth-bearing plates, corresponding to the internal dentaries of the opposed mandible. I have no doubt that the same arrangement prevails in all these families, though in the Osteolepidæ we may expect the tooth-bearing ossicles to be anchylosed to the palato-pterygoid.

The only other fossil in my collection attributable to the species under consideration is the impression of the inner surface of a large jugular plate, 7 inches in length by 2$\frac{5}{8}$ in breadth, but which is, I rather think, imperfect anteriorly. It certainly does not belong to *Holoptychius*, as it has not the triangular shape characteristic of the jugulars in that genus, and as its shape, on the other hand, reminds us of that of the corresponding plate in *Rhizodus*, it seems extremely probable that it appertains to the same species as the one under consideration.

The determination of the Upper Devonian Rhizodontidæ of Scotland and Russia is a matter of great difficulty, owing to the fragmentary condition in which their remains are found. The present jaws have a considerable resemblance to those from the Upper Old Red of Clashbennie in Perthshire, named by Agassiz *Bothriolepis favosa*, and doubtfully referred by Smith Woodward to Hall's genus *Sauripterus* (47, p. 363), from the Catskill (Upper Old Red) formation of Pennsylvania. But in the jaws both from Clashbennie and Pennsylvania the teeth are two-edged to the base, so that if this is to be retained as a generic character, the allocation of the Nairn jaws must be sought elsewhere. But in the Upper Devonian rocks of Russia there occur Rhizodont remains with teeth rounded in transverse section, to which Pander gave the name *Polyplocodus*, under the idea that they were identical with Agassiz's *Cricodus*, which latter name he rejected as unsuitable (35, p. 28). As it is not now considered allowable to alter an author's generic name on account of unsuitability, real or supposed, these teeth and jaws have been referred to '*Cricodus*' by Rohon,[1] Trautschold,[2] and

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[1] *Mém. Acad. Imp. Sci. St. Pétersbourg* (7), vol. xxxvi., No. 14, 1889, p. 49.

[2] *Zeitschr. deutsch. geol. Gesellschaft*, vol. xli., 1890, p. 629, Pl. xxiii.-xxv.

Smith Woodward (47, p. 363). But, as we shall see further on (p. 270), I have shown that the tooth which Agassiz adopted as the type of *Cricodus* is not a Rhizodont tooth, but belongs, where Duff originally referred it, to the genus *Dendrodus* of Owen, that is, *Holoptychius* of Agassiz. The genus *Cricodus* therefore falls, and Pander's name *Polyplocodus* must come into use for the Russian remains in question, with which the Nairn specimens are evidently closely allied, and for which I now propose the name of *Polyplocodus leptognathus.*

Family **COCCOSTEIDÆ.**

Genus *COCCOSTEUS, Agassiz.*

Coccosteus magnus, *sp. nov.*

(Plate vi. fig. 10.)

Among the fish-remains from Kingsteps in my collection is a unique plate represented in Plate vi. fig. 10. It is bilaterally symmetrical, and measures 2¼ inches in length by the same in greatest breadth. Its broad anterior margin is gently rounded, and passes out on each side into a sharp angle, which immediately falls away behind into the lateral margin; the two lateral margins then gently converge to the very short posterior one, which truncates the bone behind. The surface exhibited, obviously eroded, is slightly concave in front and flat behind, and exhibits in its middle third a slightly elevated central longitudinal ridge.

That this is the anterior median ventral plate of a large Coccostean, seen from the inner side, is beyond all doubt. It differs, however, not only in its great size from that of *C. decipiens*, but also in its greater proportional breadth, and in the fact that along its anterior aspect no facet is seen for taking part in the articulation with the interlateral plate. But the plate is evidently considerably eroded, besides which, in this species, the interlateral articulation, which apparently takes place on both sides of the anterior margin of the corresponding plate in *C. decipiens* and *C. minor*, probably here were limited to the outer surface. It may be noted that the contour of the plate is quite similar to that of the one figured by Pander from the Aa in Livonia (33, Pl. B., fig. 1).

Possibly the access of additional material may show that these Scottish and Russian Upper Devonian Coccostean remains are generically distinct from the true *Coccosteus* of the Orcadian series, but there is for the present no other place for them but in that genus. It is to be remembered that a true *Coccosteus* (*C. canadensis*, A. S. Woodward), occurs in the Upper Devonian of Canada.

The list from the Nairn Sandstone stands therefore as follows:—

Asterolepis maxima (Agassiz).
Holoptychius decoratus, Eichwald.
Polyplocodus leptognathus, Traquair.
Coccosteus magnus, Traquair.

Small as it is, the interest of this fauna consists not merely in its being altogether different from that of the adjoining district of Elgin, but also in its resemblance in general features to that of the banks of the Aa in Livonia.

FISHES OF THE UPPER OLD RED SANDSTONE OF THE ELGIN DISTRICT.

The eastern boundary of the Nairn beds must be not far from the old quarry of Boghole already mentioned, for at Whitemire, close by, the characteristic Asterolepid of the Elgin district, namely *Bothriolepis major*, has already appeared. From Alves station eastward to the Quarry Wood, in the direction of Elgin, the following quarries of the Upper Old Red may be noted in succession, namely,—Sweet Hillock, Cloves, Cardenhill, Milton Quarry, Newton. In the Quarry Wood itself are the quarries of Rosebrae, Oakbrae, Hospital Quarry, Laverockloch; and in the same line, immediately to the north of Elgin, is the quarry of Bishopmill. Southward from Elgin is the quarry of Pluscarden, and also the well-known locality for Upper Old Red fossils at Scaat Craig.

The fossil remains of the Scaat Craig exposure, first discovered by Martin, were in past times industriously collected by Patrick Duff, Dr. Malcolmson, Major Brickenden, Mr. J. Grant, and others.[1] The first discovery of fish-remains in the immediate neighbourhood of Elgin (Bishopmill) was made by the late Rev. Dr. Gordon, and to his labours is especially due the accumulation in the Elgin Museum of a large amount of material from the quarries of the Alves district. More recently, Mr. Taylor of Lhanbryde has taken up the matter with signal success, as we shall presently see, nor can I omit to mention the name of the Rev. Mr. M'Kemmie, schoolmaster at Alves, to whose kindness the Edinburgh Museum is indebted for several interesting specimens from the quarries in the immediate vicinity of his place of work.

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[1] The late Mr. Jenkins of Elgin assiduously collected these fossils for sale.

Sub-class *ELASMOBRANCHII.*

Order **SELACHII.**

Family **PSAMMOSTEIDÆ.**

Genus *PSAMMOSTEUS*, *Agassiz.*

Psammosteus Taylori, *Traquair*, 1894.

SYN. *Megalaspis Taylori*, Traq.

(Pl. vi. figs. 1-3.)

Among the fish-remains from the Alves district collected by the late Rev. Dr. Gordon more than twenty years ago, and now in the Elgin Museum, I observed a number of large plates, more or less fragmentary, which at that time shared the name of '*Pterichthys major*,' with every other plate of any size found in the Upper Old Red Sandstone. That these were totally unlike the remains of any Asterolepid was obvious enough, but as to what they were I had no clew, and being occupied with other matters I allowed the question to become dormant. In 1884 a specimen from Newton was purchased for the Edinburgh Museum from the late Mr. Jenkins of Elgin.

About a year and a half ago I was induced to take the matter up by my friend Mr. William Taylor of Lhanbryde, who had succeeded in procuring some additional specimens from Newton Quarry, among which was one of a more perfect contour than any I had previously seen. None of these specimens from the Elgin district showed any trace of external ornament, but my attention had been drawn to *Psammosteus* by a fragment from Balnagown in Ross-shire, lent to me by Mr. Hugh Miller of H. M. Geological Survey, which showed in patches the remains of an ornament resembling that figured by Agassiz in Russian fragments belonging to that genus (22, tab. 27, figs. 2-6). Nevertheless, not feeling certain about the identity of Mr. Miller's specimen with those from Elgin, I exhibited some of the latter at the meeting of the British

Association at Oxford in 1894, under the name of *Megalaspis Taylori*. Proceeding immediately thereafter to the British Museum, on inquiring for *Psammosteus*, Mr. Smith Woodward showed me, among other specimens, two papier-maché casts of tolerably entire plates of *P. paradoxus*, Ag., from Russia, by which my doubts were at once solved, and in the 'Annals of Scottish Natural History' for October of that year I published, under the name of *Psammosteus Taylori*, an outline sketch of a specimen presented by Mr. Taylor to the Edinburgh Museum. Subsequently collected material has completely confirmed this determination; among other things, the external ornament has now been discovered in Newton specimens, thereby proving the identity with them of Mr. Miller's fragment from Balnagown.

Description.—Large oblong plates, gently hollowed in boat-like fashion, but more concave from side to side than from back to front, and more concave posteriorly than anteriorly; truncated and obtusely indented in front; sides slightly concave anteriorly, then becoming convex, so that the greatest width of the plate is behind its middle; posterior extremity bluntly pointed; a very obtuse angle often observed on each side, midway between the posterior terminal angle and the convexity of the lateral margin.

The most perfect plate I have seen is that represented in Pl. vi. fig. 1 reduced more than one-half, and measures 10¼ inches in length by 6¾ in breadth, but among the imperfect specimens belonging to the Elgin Museum are some which indicated considerably larger size, and which attained a thickness of from ¼ to ⅜ inch.

The internal surface is smooth, sometimes showing faint pustular elevations, and often also a few shallow concentric growth-furrows parallel with the margins; it is formed by a basal layer of compact tissue, with very few vascular canals. By far the greater thickness of the plate is formed, however, of a middle layer which is completely permeated by so close a meshwork of tortuous vascular canals as to appear almost spongy in texture when broken across. In most of the specimens the third or outer layer is wanting, and the surface of the exposed middle layer is seen with its vascular canals opened into, much as in a cross fracture. This outer surface of the middle layer is sometimes even, but in many cases it exhibits an arrangement of shallow polygonal depressions, fitting closely to each other like the cells of a honeycomb, as is shown in Pl. vi.

fig. 3. Besides this, in some cases, some comparatively large, irregularly branching and anastomosing grooves are seen running over the surface, which would be converted into canals by the outer layer when present.

The outer layer is very thin, and evidently has been liable to be easily detached, as it is wanting in most of the specimens from the Elgin district. When present it is seen to display an ornament of small closely placed stellate tubercles (Pl. vi. fig. 2 magnified diameters) which are coarser and more irregular in shape than those of the allied Russian species *P. paradoxus* and *P. arenatus.* But it is worthy of note that in one specimen I have found the surface of the outer layer marked off into polygonal slightly convex areas, as is often seen in *P. paradoxus,* these areas corresponding to the polygonal depressions exhibited in other specimens when the outer layer is wanting. Clearly, therefore, the outer layer in such cases tends to fall into small scale-like polygonal pieces thicker in the centre than at the margins (=lenticular), and which are indeed sometimes found detached in the Russian deposits which yield *P. paradoxus.*

Remarks.—As the plates of *Psammosteus* exhibit on microscopic examination no bone-lacunæ, but only dentine tubules, the genus is now generally referred to the Elasmobranchii, and considered to represent a group of armoured sharks, of which we have of course no representatives at the present day. The minute stellate tubercles which form the ornament of the outer layer are clearly shagreen bodies which have coalesced, as very similarly-shaped bodies, still disunited, may be seen to form the dermal covering in Powrie's *Cephalopterus Pagei* [1] from the Lower Old Red of Forfarshire; the subjacent thickness of the plate being formed in a deeper layer of the skin. Only one form of the shield has been discovered, so far as *P. Taylori* is concerned at least, and that it was a body and not a head shield, a dorsal and not a ventral one, are about the best surmises we can make as to its position on the animal. In the same way we may guess that the pointed extremity was posterior, though we have no real information on the subject.

But associated with the plates of *Psammosteus* in Russian localities are certain spine-like bodies showing a similar external ornament, as well as a similar microscopic structure. Some of these spines are bilaterally symmetrical, and are clearly median structures, like the one figured by Pander (33, Pl. vii. fig. 16); others evidently were paired appendages, and were indeed figured by Trautschold as pectoral limbs of *Coccosteus*. That these bodies could not belong to *Coccosteus*, and that they were in all probability appendages of a shark or selachian was pointed out by me in my paper on the last-named genus (46, pp. 133-134); and in his Catalogue (47, p. 126) Mr. Smith Woodward has brought them under *Psammosteus*. Now, none of these spines, either median or lateral, have been found in the quarries near Elgin, which yield the plates of *Psammosteus Taylori*. I am however indebted to Mr. Grant of Lossiemouth for the opportunity of figuring a fragment of a lateral spine found by him at Scaat Craig, from which locality also Mr. W. Taylor has more recently obtained small pieces of Psammostean plates. This fragment is represented in Pl. vi. fig. 4, and is evidently the mere termination of one of these appendages. It measures $\frac{7}{8}$ inch in length by $\frac{3}{8}$ inch in breadth where it is broken off proximally. Its surface is ornamented by stellate tubercles, which are, however, elongated in form and arranged in parallel concentric arches, whose convexities are directed towards the broken apex of the spine. In none of the other collections of fossils from Scaat Craig which I have examined have I seen anything of this nature.

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[1] The name '*Cephalopterus,*' having been preoccupied as early as 1809, is not admissible in this case. I therefore propose to substitute *Turinia,* from Turin Hill, the locality whence Powrie's specimen was derived.

Localities for Psammosteus Taylori.—Balnagown, Ross-shire; Sweet Hillock, Alves; Newton Quarry, between Alves and Elgin.

Lateral spine of *Psammosteus*, sp.—Scaat Craig.

As mentioned above, fragments of plates apparently belonging to *Psammosteus* have recently been found by Mr. W. Taylor at Scaat Craig, but it is doubtful whether they are referable to the same species as that which occurs in the Alves district and at Balnagown.

Selachian Spines.

Genus *COSMACANTHUS*, *Agassiz.*

Cosmacanthus Malcolmsoni, *Agassiz*, 1845.

(Pl. vi. figs. 6-9.)

The very beautiful fragment from Scaat Craig, named by Agassiz *Cosmacanthus Malcolmsoni* (29, p. 120, Pl. 33, fig. 28), and considered by him to be a selachian spine, was interpreted by Pander as the penultimate plate (external marginal) of an Asterolepid 'forearm.' On the acquisition, by the Edinburgh Museum, in 1892, of the Powrie Collection, in which the original specimen was contained, I expressed the opinion (48, p. 36) that the sculpture of *Cosmacanthus Malcolmsoni* was 'different from that on the arms of *Bothriolepis major*, the common Asterolepid of the Scaat Craig deposit,' though at the same time I did not consider it to be a selachian spine. Previously, however, M'Coy and Davis had referred no less than four species of selachian spines from the carboniferous limestone of Armagh to the genus.[1]

To the kindness of Mr. W. Taylor I owe a large fragment of the same body, which was found by him at the same locality in the course of the summer of the present year (1895), and which I have represented in Pl. vi. figs. 6-9. It is a portion of the basal extremity of a spine, $1\frac{5}{16}$ inch in length, by nearly half an inch in breadth, laterally compressed, and showing two margins, besides the extremities, both of which are broken off. One margin, gently curved and very narrow, shows two rows of small tubercles, as in the type specimen; the opposite margin, or rather aspect, shows a wide cleft opening into the internal cavity of the spine, and which closes up just before the specimen is broken off distally, and there it becomes a slight groove, which is not, however, quite symmetrically placed, as it looks more to one (the more convex) side than to the other. Nor are the two sides symmetrical, for one is slightly more convex than the other, which is nearly flat; both are covered with small, irregularly-placed stellate-based tubercles, which are somewhat larger on the more convex of the two sides; there is, however, a longitudinal narrow groove, free of tubercles, running along the edge of each of the sides, where it forms the lip of the open part of the internal cavity. The broken distal aspect of the spine shows a shut-off continuation of this cavity, which is very narrowly oval in transverse action. The fractural surfaces show that the interior of the tissue is permeated by a very close network of vascular canals, though I have not ventured to make so fragmentary a specimen smaller still by taking off a piece for microscopic investigation.

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[1] See J. W. Davis, in 'Fossil Fishes of the Carboniferous Limestone Series,' *Sc. Trans. Roy. Dublin Society*, vol. i. ser. 2, 1883, pp. 355-358.

The above described characters are not those of any part of the dermal armature of an Asterolepid, but, on the other hand, clearly point to *Cosmacanthus* being a selachian spine, as was originally supposed, though from its want of bilateral symmetry it was in all probability a lateral appendage, as in the cases of *Oracanthus*, *Gyracanthus*, etc. The identity of the specimen here described with Agassiz's type cannot for a moment be doubted ; for that too shows the same want of bilateral symmetry, the only difference being that the small tubercles on the more convex side show a tendency to being arranged in longitudinal rows, like the two rows of larger ones along the margin.

The definition of *Cosmacanthus* will therefore stand : Spines much compressed, gently arched, not bilaterally symmetrical, one surface being more convex than the other. Free surface ornamented with small stellate tubercles ; posterior area represented by a slight groove unsymmetrically placed ; no denticles. It is therefore clear that the carboniferous species referred by M'Coy and Davis to *Cosmacanthus* cannot belong here, as they are apparently ordinary bilaterally-symmetrical dorsal-fin spines.

Fragments of other selachian spines occur in the Scaat Craig deposit, but they are not sufficiently perfect to warrant their description at the present moment.

Sub-class *OSTRACODERMI*.

Order **ANTIARCHA.**

Family **ASTEROLEPIDÆ.**

Genus *BOTHRIOLEPIS*, *Agassiz.*

Bothriolepis major (*Agassiz*), 1844.

SYN. *Pterichthys major*, Agassiz ; *Placothorax paradoxus*, Agassiz ; *Bothriolepis giganteus*, Traquair.

(Restored outline, surface ornament omitted, Pl. viii.)

'*Pterichthys major*' was the name originally given by Agassiz (29, p. 19, Pl. 31, figs. 1-3) to the base of an arm from Scaat Craig, while to other portions of the arm further on he applied the name of *Placothorax paradoxus* (*ib.* p. 134, Pl. 30 *a*, figs. 20-23), while portions of the large body plates of the same fish from Alves he identified with Eichwald's *Bothriolepis ornata* (*ib.* Pl. 29, figs. 1-5). I myself at one time looked upon the large plates from the Alves region as representing a distinct species, characterised not merely by greater size but also by the coarseness of its sculpture. I have, however, subsequently found that all through the *Asterolepidæ* the sculpture is coarser in larger and older than in smaller and younger specimens, and consequently I now look upon the Alves specimens as only representing the adult form of the species. (See 49, p. 285.)

Though generally occurring in a disjointed condition, quite a sufficient number of the remains of *Bothriolepis major* have now been found to afford us a pretty complete idea of its configuration, and this I have attempted to put together in the rectoral figure of the dorsal surface, Pl. viii. Its form is depressed, the dorsal surface being very slightly arched, though in small specimens a feeble carination of the middle line is sometimes observable.

This is the largest of all British *Asterolepidæ*, and reckoning from the size of detached plates some individuals must have attained a length, head and carapace together, of at least a foot and a half. As in the other species of the genus, the tail is unknown.

The largest plates have occurred as yet only at Whitemire and in the Alves district, as at Sweet Hillock; Carden Hill road-metal quarry; Millstone Quarry; Newton. In the Quarry Wood localities, situated more towards Elgin, as at Rosebrae, Oakbrae, and Laverockloch, only small specimens have been found as yet, but some of these are nearly perfect so far as the head and dorsal surface of the body are concerned. The original locality is Scaat Craig, where fragments of the plates and arms of medium-sized specimens are very common.

Bothriolepis cristata, *sp. nov.*

(Pl. ix. figs. 1-3.)

Shortly before his lamented death, the late Rev. Dr. Gordon showed me a specimen of *Bothriolepis* from Rosebrae, with the appearance of which I was immediately struck. The body carapace, with what remained of the head, being removable from the matrix, was in a singularly uncompressed state; the back, having only received a slight oblique squeeze from left to right, was seen to be more lofty in shape than is usual in the species of this genus, while the matrix showed apparently the impression of an elevated laminar crest rising from the middle line of the dorsal surface. Shortly afterwards Mr. William Taylor procured from the same quarry two additional specimens, showing the impression of part of the back in such a way as clearly to prove the existence of this singular crest.

I regret that space will not permit of my figuring Mr. Taylor's specimens, which he kindly presented to the Edinburgh Museum, but in Plate ix. figs. 1-3, I have represented in three views the original example procured by Dr. Gordon, and now in the Museum at Elgin.

Fig. 2 shows the ventral surface of the specimen replaced in the matrix, on which is also seen the greater part of the left pectoral appendage or 'arm.' The length of this arm shows that the present species is referable to *Bothriolepis*, as, although its extremity is incomplete, it has clearly extended beyond the carapace posteriorly; the 'upper arm,' too, extends to opposite the middle of the posterior ventro-lateral plate (*p. v. l.*), where the joint between it and the 'forearm' is distinctly seen. On the body carapace are the right and left anterior ventro-laterals (*a. v. l.*), with the small *semilunar* (*s. l.*) between them in front, as well as the two *posterior ventro-laterals* (*p. v. l.*), and the lozenge-shaped space in the centre occupied by the *median ventral* (*m. v.*). On the right side of the body in front is seen the place of attachment of the right pectoral appendage (*ar.*).

In Fig. 1 the specimen, still in the matrix, is shown from the right lateral aspect, whereby the unusual height (for *Bothriolepis*) of the sides is brought into view. This is seen to be due to the considerable depth of the lateral portions of the anterior and posterior dorso-lateral plates (*a. d. l.* and *p. d. l.*), which are at least twice as deep proportionally as in species of the usual depressed types, such as *B. major*, *Canadensis*, *hydrophila*. Then, on the matrix at *cr*, the impression of the dorsal crest is seen arising from the middle line of the anterior median dorsal just behind the centre of the plate, whence it is continued backwards over two-thirds of the extent of the posterior median dorsal; the crest itself is higher about its middle third, and falls away gently both in front and behind.

The view of the dorsal surface, Fig. 3, requires little comment, except that it appears proportionally rather narrower than is usually the case in *Bothriolepis*. The head is much injured, and presents no points for description.

This new species of *Bothriolepis* is then distinguished from all others by the elevated crest on its dorsal surface, and from all except *B. obesa*, Traq., by the comparatively lofty contour of the body carapace.

Locality.—As yet only at Rosebrae Quarry, near Elgin. Three specimens are known, one of which, here figured, is in the Elgin Museum; the other two are in the Museum of Science and Art, Edinburgh.

Incertæ sedis.

Family **PHYLLOLEPIDÆ.**

Genus *PHYLLOLEPIS*, *Agassiz.*

Phyllolepis concentrica, *Agassiz*, 1844.

Two fragments of this problematical fish-plate have been procured by Mr. W. Taylor—one from Laverockloch and the other from the Hospital Quarry, near Elgin.

Sub-class *DIPNOI.*

Order **SIRENOIDEI.**

Family **CTENODONTIDÆ.**

Genus *CONCHODUS*, *M'Coy.*

Conchodus ostreiformis, *M'Coy*, 1848.

One specimen only known, namely, a palatal tooth in the collection of the Woodwardian Museum, Cambridge. Scaat Craig.

Sub-class *TELEOSTOMI.*

Order **CROSSOPTERYGII.**

Family **HOLOPTYCHIIDÆ.**

Genus *HOLOPTYCHIUS*, *Agassiz.*

Holoptychius nobilissimus, *Agassiz*, 1839.

SYN. *Gyrolepis giganteus*, Ag.; *Holoptychius Murchisoni*, Ag.; *H. Dewalquei*, Lohest; *H. inflexus*, Lohest.

(Restored figure of the closely allied *H. Flemingii*, Ag., from Dura Den, Fifeshire, Pl. ii. fig. 4).

Mr. Smith Woodward has placed *H. Dewalquei*, Lohest, as a synonym of *H. nobilissimus*, Ag. I have not seen the original specimens, but so far as one may judge from M. Lohest's figures,[1] I can also see no essential difference between his *H. inflexus* and the present species.

Detached scales at Newton, Rosebrae, Leggat, Hospital Quarry, Laverockloch, Pluscarden, Bishopmill, Scaat Craig. At Cuttie's Hillock a portion of the body has occurred in the same quarry as that in which Triassic beds yielding reptilian remains have been worked, but in a lower stratum.

Holoptychius giganteus, *Agassiz.*

SYN. *Holoptychius princeps*, M'Coy.

Detached scales, teeth, and jaws, at Sweet Hillock, Carden Hill, Millstone Quarry, Newton, Scaat Craig.

The teeth and jaws, for which the late Sir Richard Owen instituted the genus *Dendrodus*, certainly belong to *Holoptychius*, and the teeth of the closely allied, if not identical, *Glyptolepis* possess the same structure. This was indicated already in 1842 by Patrick Duff in his *Geology of Moray* (7, pp. 30-31), and subsequently stated as certain by Hugh Miller (14, chap. xii.). The last-mentioned author also figured in 1849 (*Footprints of the Creator*, first edition, pp. 81, 82) the dendrodont structure of the teeth of *Glyptolepis paucidens*, which he however unfortunately attributed to 'Asterolepis' (i.e. *Homosteus*). That this peculiar structure of the teeth is simply one of the family characteristics of the Holoptychiidæ is a fact upon which I have myself repeatedly insisted, and which is now, I think, generally acknowledged.

The large two-edged conical teeth known as *Dendrodus biporcatus*, Owen, and *D. latus*, Duff, belong pretty certainly to *Holoptychius giganteus*, Agassiz, with the scales of which they are associated at Scaat Craig, Newton, and the Millstone Quarry. At these localities portions of jaws of considerable size, with the teeth attached, have occurred, and these jaws are unmistakably Holoptychian in configuration.

The more slender and elongated teeth, usually sigmoidally curved, and which are not two-edged until pretty high up in the shaft, known as *Dendrodus strigatus* and *sigmoideus*, Owen, have in

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[1] *Ann. Soc. Geol. Belg.*, vol. xv., Plate i. fig. 5; Plate ii. figs. 1-4; Plate iii. figs. 1, 3, 5, 6; Plate v. figs. 1-3 (*H. Dewalquei*); and Plate iv. figs. 1-7 (*H. inflexus*).

Scotland been as yet only found at Scaat Craig. I have hazarded the opinion that they belong to *Holoptychius nobilissimus* (48, p. 35). Teeth of a similar shape occur in the allied *H. Flemingii*, Agassiz, from Dura Den, in Fifeshire.

In this category I must place the tooth figured by Duff (7, Plate vi. fig. 11) as *Dendrodus incurvus*, and refigured by Agassiz as the type of his genus *Cricodus*. I may here quote my own words, as published in 1892 (48, p. 35):—'Agassiz's genus *Cricodus* has been referred to the Rhizodontidæ by myself and Mr. Smith Woodward on account of Pander's identification of it with his *Polyplocodus*, which assuredly belongs to that family, and also because the transverse section of a tooth figured by Agassiz as *Cricodus*, without specific name (*Poiss. Foss.*, vol. ii. pt. i. tab. H, figs. 11, 12), is apparently of Rhizodont character. But Agassiz in the text (*ibid.* p. 156) states that the tooth from which this section was taken had its large pulp-cavity filled with a black matrix; likewise that it was a fragment broken at both ends which 'provenait d'une dent enorme, car il avait la grosseur d'un doigt.' It is therefore almost certain that this Rhizodont tooth, which he says is from Scotland, without naming any precise locality, is of carboniferous age, especially seeing that a few pages further back (*ibid.* p. 105) he states that *Cricodus* occurs both in Devonian and Carboniferous rocks. It is certainly very different from the tooth figured by Duff as *Dendrodus incurvus*, which Agassiz afterwards refigured in his *Fossil Fishes of the Old Red Sandstone* as *Cricodus incurvus*, and apparently adopted as the type of the genus, seeing that he named no other species; for on examining this species of *incurvus* I found, somewhat to my surprise, that it was in reality a Dendrodont or Holoptychian tooth, apparently belonging to Owen's species *D. sigmoideus*, and this, I have long been convinced, is synonymous with *Holoptychius nobilissimus* of Agassiz. The name *Cricodus* must therefore drop, as no genus can be founded on the fragment of which a section is figured in Agassiz's larger work.'

Family **RHIZODONTIDÆ.**

Genus *POLYPLOCODUS*, *Pander.*

Fragments of dentigerous bones, not at present determinable, but showing roots of Rhizodont teeth, from Scaat Craig, in the Edinburgh Museum.

Family OSTEOLEPIDÆ.

Genus *GLYPTOPOMUS*, *Agassiz.*

Glyptopomus minor, *Agassiz.*

Two specimens, nearly entire fishes, are known from this district, and are both in the Elgin Museum. One of these, the splendid example figured by Huxley (38, Plate i. fig. 1) is from Laverockloch; the other, somewhat smaller in size, is from Rosebrae.

We may now put together the fish-remains of the Elgin series of the Upper Old Red in the following list:—

Psammosteus Taylori, Traquair.
Psammosteus, sp. undetermined.
Cosmacanthus Malcolmsoni, Agassiz.
Spine, undetermined.
Bothriolepis major (Agassiz).
Bothriolepis cristata, Traquair.
Phyllolepis concentrica, Agassiz.
Conchodus ostreiformis, M'Coy.
Holoptychius nobilissimus, Agassiz.
Holoptychius giganteus, Agassiz.
Polyplocodus, sp.
Glyptopomus minor, Agassiz.

On the other side of the Moray Firth the Ross-shire Upper Old Red seems to belong to the same series, as shown by the occurrence of *Psammosteus Taylori* at Balnagown, and of scales of *Holoptychius nobilissimus* and *giganteus* in the Dornoch region.

So far as the species can be determined, we find a total discrepancy between this list and that from the Nairn Sandstone, and we are also struck with the fact that the former is, if we may use the term, more 'orthodox' for the Upper Old Red Sandstone of Scotland. The widely distributed *Holoptychius nobilissimus* occurs here, but not at Nairn. The genus *Bothriolepis*—represented, it is true, by other species—is found in the Upper Old Red of Fifeshire, Ayrshire, Berwickshire, Roxburghshire, but not at Nairn, where the common Asterolepid (*Asterolepis maxima*) belongs to a genus nowhere else found in Scotland. *Phyllolepis concentrica* and *Glyptopomus minor* occur in Fifeshire, the former also in Perthshire, but have not as yet been found at Nairn, though, as these are rare fossils, their non-occurrence in any particular bed or beds may not be considered as of prime importance.

I have no desire to trespass on the special functions of the field-geologist, yet at the same time I cannot avoid expressing the conclusion that these two faunæ represent different geological horizons, of which that of Nairn is probably the older.

It may also be of use and interest to the geologist proper if I conclude this subject by giving lists of the fish-remains found in the various localities respectively in the neighbourhood of Elgin. In the preparation of these lists I have received very great assistance from the collections made by my friend Mr. Taylor, who has for the past two years so enthusiastically devoted himself to the work.

Whitemire, near Brodie Station.—*Bothriolepis major.*
Sweet Hillock, Alves.—*Psammosteus Taylori*, *Bothriolepis major*, *Holoptychius giganteus.*
Carden Hill, Alves.—*Bothriolepis major*, *Holoptychius giganteus.*
Millstone Quarry, Alves.—*Psammosteus Taylori*, *Bothriolepis major*, *Holoptychius giganteus.*
Newton.—*Psammosteus Taylori*, *Bothriolepis major*, *Holoptychius giganteus*, *H. nobilissimus.*
Leggat.—*Holoptychius nobilissimus.*
Rosebrae.—*Bothriolepis major* (small), *B. cristata*, *Holoptychius nobilissimus*, *Glyptopomus minor.*
Oakbrae.—*Bothriolepis major* (small), *Holoptychius nobilissimus.*
Hospital Quarry.—*Phyllolepis concentrica*, *Holoptychius nobilissimus.*
Laverockloch.—*Bothriolepis major* (small), *Phyllolepis concentrica*, *Holoptychius nobilissimus*, *Glyptopomus minor.*
Bishopmill.—*Bothriolepis*, not specifically determinable; *Holoptychius nobilissimus.*
Cuttie's Hillock.—*Holoptychius nobilissimus.*
Pluscarden.—*Holoptychius nobilissimus.*
Scaat Craig.—*Psammosteus* sp., *Cosmacanthus Malcolmsoni*, *Bothriolepis major*, *Conchodus ostreiformis*, *Holoptychius nobilissimus*, *H. giganteus*, ? *Polyplocodus*, sp.

The above lists, along with the lithological characters of the beds at the various exposures, are indeed of great interest from a geological point of view, but to pursue the subject from this aspect would lead us too far from the essential scope of this essay, which is of course before all things palæontological.[1]

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[1] Nevertheless I cannot refrain from mentioning that Mr. W. Taylor has pointed out to me that the fine-grained sandstones of the Quarry Wood, which at Cuttie's Hillock pass under the Triassic Reptiliferous beds, apparently form a distinct and upper subdivision of the Elgin series. Unlike the Alves, Newton, and Scaat Craig strata, they contain no coarse grit or conglomerate, and as to fossils, *Psammosteus* has not yet been found in them, while the remains of *Bothriolepis major*, which have

Before leaving the subject of the Upper Old Red Sandstone, I must refer to the supposed footprints of land animals, presumably reptiles, which have been stated to occur on slabs of sandstone of this age, from Nairn, Bishopmill, and Tarbet Ness. It may well be supposed that the advocates of the view that the Reptiliferous sandstones of Moray are also of Old Red age would point to the discovery of such footprints in undoubted Upper Old strata as corroborative evidence for their side of the question.

Having recently examined the specimens of these appearances from the above-named localities, which are contained in the Elgin Museum, I must confess that the result has been to make me completely sceptical as to their being footprints at all.

The specimens from Nairn and Bishopmill may, in my opinion, be at once dismissed from the category to which they have been referred. The impressions, or obverses of impressions, are quite irregular, present no appearance of *tracks*, and I have no doubt as to their being concretionary in their nature.[1]

Those from Tarbet Ness are somewhat more like footprints, but they show no toes, and my examination of them convinced me that they too are concretionary structures.

The appearances resembling footprints, or casts of footprints, often assumed by similar concretionary structures, may indeed be remarkably deceptive,—even the presence of *toes* may be simulated. Such things are not uncommon in the Caithness flagstones, where they sometimes, in fact, bear considerable resemblance to footprints of mammals, even of man!

THE VERTEBRATA OF THE MORAYSHIRE TRIAS.

A. REPTILIFEROUS SANDSTONES=? KEUPER.

The yellowish and whitish sandstones which come on to the northward of the *Holoptychius*-bearing beds in the Elgin district, and

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occurred, are characterised by their small size. On the other hand, they contain *Phyllolepis concentrica* and *Glyptopomus minor*, species also occurring in the uppermost Old Red at Dura Den, but not as yet in the Alves and Newton beds.

[1] Professor Judd states (22, p. 140) that Professors Huxley and Rupert Jones had, after examining a cast of the supposed footprints from Nairn, pronounced these markings to be of 'exceedingly doubtful origin.'

extend to the sea between Burghead on the west and Lossiemouth on the east, were formerly universally believed to form part of the same Upper Old Red Sandstone formation, seeing that no distinct unconformity or 'physical break' had ever been clearly demonstrated to exist between the two sets of rocks. The first fossils found in the former series, namely, the scutes of *Stagonolepis*, did nothing to disturb that belief, as they were considered by Agassiz to belong to a ganoid fish; nor did even the subsequent discovery of a true Reptile, the *Telerpeton Elginense* of Mantell, arouse any doubts in the minds of geologists. People were only thereby led to include Lizards in the vertebrate fauna of the Old Red Sandstone or Devonian period. It was, however, when Huxley showed that *Stagonolepis*, instead of being a ganoid fish, was a crocodilian of Mesozoic type, and also noted the occurrence in these rocks of another reptilian genus, *Hyperodapedon*, which is also found in the Trias of Warwickshire and of India, that the foundations of the old faith were sapped, in spite of the devotion of a few steadfast adherents, such as the late Professor Harkness and the late Rev. Dr. Gordon of Birnie. The view that these 'Reptiliferous sandstones' of Morayshire were after all not of Devonian but of Triassic age, was adopted by Sir Roderick Murchison in 1867 (21, p. 267), and has more recently received still more striking confirmation by the discovery at Cuttie's Hillock of another set of reptiles belonging to the triassic groups, Dicynodontia and Pareiasauria. These have been described by Mr. E. T. Newton, F.R.S., in two memoirs (63 and 64), published by the Royal Society of London.

This reference of the Reptiliferous sandstones of Moray to the Triassic formation is now, I may say, practically adopted by geologists, though the late Rev. Dr. Gordon, three years ago, and shortly before his much lamented death, published a paper (26) in which he sought to maintain that the question was still unsettled.

I have stated that no distinct physical break had been shown to exist between these reptile-bearing rocks and those of undoubted Upper Old Red age, which might have been reasonably expected if so great a length of time had intervened between their respective periods of disposition as meanwhile to allow of the accumulation in other parts of the country, and of the world, of the vast thicknesses of strata constituting the Carboniferous and Permian systems. Though no vestige of an Old Red fish had been found in the same block of stone or in the same stratum with a reptilian bone, the exact junction of the two sets of beds had nowhere been seen. However, as Professor Judd relates (24), an old quarry at Cuttie's Hillock, close to the Old Red beds of the Quarry Wood range, was re-opened in 1882, in which the Dicynodont and Pareiasaurian remains above alluded to were discovered, while in a deep excavation at the bottom of the quarry, temporarily made and presently abandoned, an undoubted specimen of *Holoptychius nobilissimus*, now in the Elgin Museum, was found. This excavation was investigated by Professor Judd, who came to the conclusion that the upper or reptiliferous series had for its base a bed of conglomerate, which rested on an *eroded* surface of the lower series containing the *Holoptychius* referred to. It is true that the sufficiency of this demonstration has been questioned by the late Dr. Gordon and Mr. Gordon Phillips, on the ground that the conglomerate band is a mere local phenomenon, and disappears in other parts of the quarry, and it is certainly to be regretted that the junction was exhibited for so extremely limited an extent as ten feet ; yet the superposition of the Reptiliferous beds is clearly established, and the affinities of their contained reptiles leave no doubt as to their Triassic age.

Footprints also, of which there can in this case be no doubt as to their reality, have occurred in these rocks at certain localities towards the sea, notably at Cummingstone and Hopeman. They were discovered in 1851 (13) by Major (then Captain) Brickenden, and have been figured and described by Huxley (59, pp. 49, pl. xiv.-xvi.), who, considering them allied to certain footprints from the Red Sandstones of Dumfriesshire, to which Sir W. Jardine gave the generic name of *Chelichnus*, proposed to designate them *Chelichnus megacheirus*. They might, in his opinion, have been made by a five-toed Parasuchian or Ornithoscelid (Dinosaurian) reptile.

It is also an interesting fact that the Reptiles found at Cuttie's Hillock, though also Triassic in *facies*, are, as Mr. E. T. Newton observes, different from those found in any other part of the area of the Reptiliferous sandstone.

The remains themselves occur either as detached bones and scutes, or as skeletons more or less entire. It must be noted that in very many cases the bone substance has entirely disappeared, leaving a hollow cavity or mould in the rock, from which a cast must be made—gutta-percha is the best material,—in order that the form of the bone itself may be reproduced for purposes of description and illustration. This is the condition of all the reptilian remains found at Cuttie's Hillock, but some of those from Lossiemouth, especially the beautiful skeleton which afforded material to the late Professor Huxley for his last paper on *Hyperodapedon Gordoni*, have the actual bone in a good condition.

The only fish-remain which I have heard of being obtained in these beds is a '*Ceratodus*-like fish-tooth,' from Spynie. This has, however, no bearing on the age of the rocks, for although *Ceratodus* proper is a Triassic genus, teeth more or less resembling it (e.g. *Conchodus*) may and do occur in strata of palæozoic age.

In the following list I have used the classification adopted by Mr. Lydekker in his 'Catalogue of the Fossil Reptiles and Amphibia in the British Museum.'

Class REPTILIA.

Order **PARASUCHIA**.

Family **PHYTOSAURIDÆ**.

Genus *STAGONOLEPIS*, *Agassiz.*

Stagonolepis Robertsoni, *Agassiz*, 1844.

Bones and scutes. Findrassie; Lossiemouth.

Genus *ERPETOSUCHUS*, *E. T. Newton.*

Erpetosuchus Granti, *E. T. Newton*, 1893.

Skull, limb-bones, vertebræ, scutes, in the collection of Mr. James Grant of Lossiemouth, and supposed to be from that locality or from Spynie.

Order **RHYNCHOCEPHALIA**.

Sub-order *HOMÆOSAURIDÆ*.

Family **TELERPETIDÆ**.

Genus *TELERPETON*, *Mantell.*

Telerpeton Elginense, *Mantell*, 1852.

Skeletons more or less entire. Spynie; Lossiemouth.

Sub-order *SPHENODONTINA.*

Family **RHYNCHOSAURIDÆ.**

Genus *HYPERODAPEDON*, *Huxley.*

Hyperodapedon Gordoni, *Huxley*, 1859.

Spynie; Lossiemouth.

Order **ANOMODONTIA.**

Sub-order *DICYNODONTIA.*

Family **DICYNODONTIDÆ.**

Genus *GORDONIA*, *E. T. Newton.*

Gordonia is closely allied to *Dicynodon*, in having the jaws edentulous with the exception of two pointed tusks, one in the maxilla of each side, and growing from permanent pulps, but is specially characterised by the presence of two post-temporal fossæ on each side of the occiput, and the comparative slenderness of all the bones of the skull.

Gordonia Traquairi, *E. T. Newton*, 1892.

Imperfect skeletons, Cuttie's Hillock.

This is the 'Dicynodont' determined by Professor Judd and myself in 1885, and noticed at the meeting of the British Association at Aberdeen in that year.

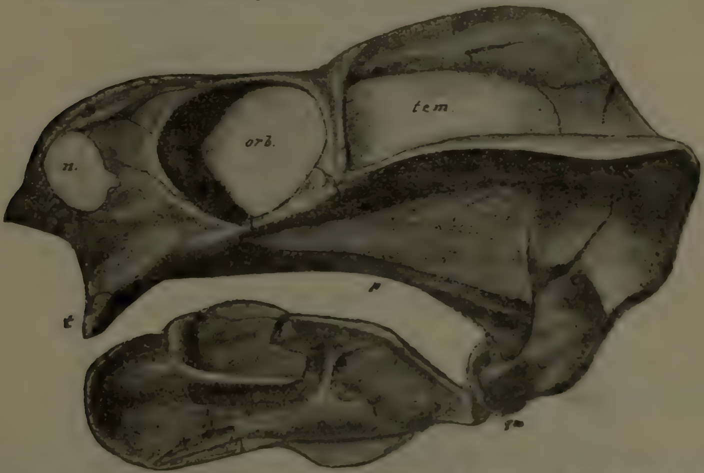

FIG. 1.—Skull of *Gordonia Traquairi*, Newton, one-half natural size, taken from a cast in gutta-percha. After E. T. Newton (63, Pl. xxxvi.). *t*, tooth: *n*, nasal opening; *orb*, orbit; *tem*, temporal fossa; *p*, palate; *qu*, quadrate.

Gordonia Huxleyana, *E. T. Newton*, 1892.
Imperfect skeleton, Cuttie's Hillock.

Gordonia Duffiana, *E. T. Newton*, 1892.
Imperfect skeletons, Cuttie's Hillock.

Gordonia Juddiana, *E. T. Newton*, 1892.
Imperfect skeletons, Cuttie's Hillock.

Genus *GEIKIA*, *E. T. Newton.*

Geikia Elginensis, *E. T. Newton*, 1892.
Skull, Cuttie's Hillock.

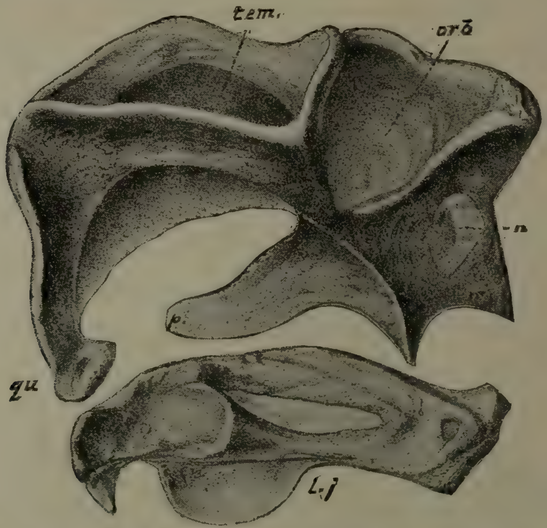

FIG. 2.—Side view of the Skull of *Geikia Elginensis*, Newton, two-thirds natural size, from a cast in gutta-percha. After E. T. Newton (63, Pl. xxxvi. fig. 2). Lettering as before, *l j*; lower jaw.

Sub-order *PAREIASAURIA.*

Family **PAREIASAURIDÆ.**

Genus *ELGINIA*, *E. T. Newton.*

Elginia miriabilis, *E. T. Newton*, 1892.
Skull, Cuttie's Hillock.

Nothing of this creature is known as yet but the skull; and a most bizarre-looking skull it is, as the accompanying figures will show, reminding us, as Mr. Newton observes, of the head of the American Horned 'Toad' (*Phrynosoma*) on a large scale.

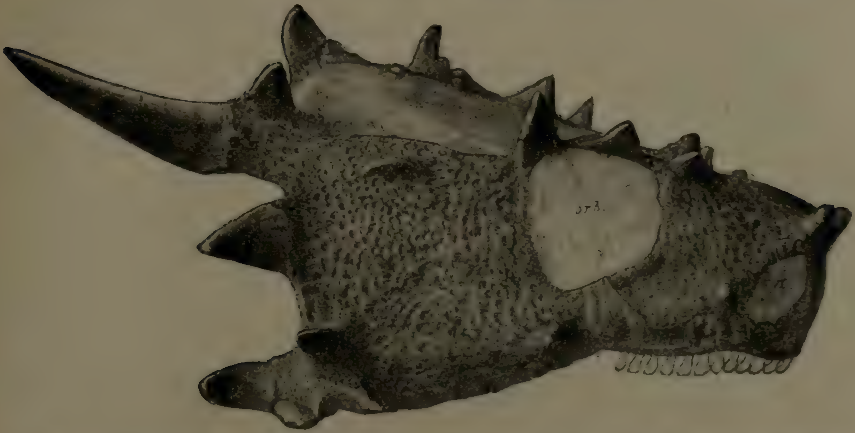

FIG. 3.—Side view of the Skull of *Elginia mirabilis*, Newton, rather less than one-half natural size, from a cast in gutta-percha. After Newton (63, Pl. xxxvii. fig. 1). Lettering as in previous figures. The lower jaw is absent.

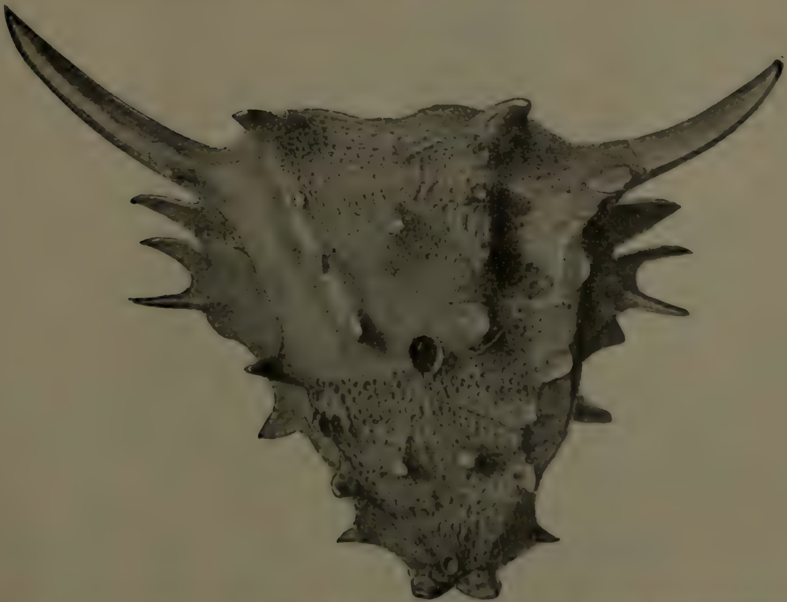

FIG. 4.—View of the top of the Skull of *Elginia mirabilis*, Newton, also from a gutta-percha cast, rather less than one-half natural size. After E. T. Newton (63, Pl. xxxviii.). In the middle line is seen the large oval pineal opening.

Incertæ sedis.

Genus *DASYGNATHUS, Huxley.*

Dasygnathus longidens, *Huxley*, 1877.

Jaw with teeth. Spynie.

Genus *ORNITHOSUCHUS, E. T. Newton.*

Ornithosuchus Woodwardi, *E. T. Newton*, 1893.

Skull, and imperfect skeleton. Spynie.

REPTILIAN FOOTPRINTS.

Chelichnus megacheirus, *Huxley*, 1877.

Cummingstone.

Class PISCES.

Sub-class *DIPNOI.*

Order **SIRENOIDEI.**

Family **LEPIDOSIRENIDÆ.**

?**Ceratodus**, *sp.*

Tooth. Spynie.

B.—RHÆTIC.

A number of mostly fragmentary specimens, both of reptilian and piscine remains, have been obtained from the supposed Rhætic deposit of Linksfield, but, with the exception of the spines and teeth of *Hybodus Lawsoni*, Duff, they have not yet been accurately determined. Among them are also teeth referable to the allied genus *Acrodus*, as well as remains of small Lepidosteoid Ganoids, probably belonging to *Semionotus*, but the subject is not at present in a condition to enable one to draw up a list which would be in any way satisfactory.

JURASSIC VERTEBRATA OF THE MORAY BASIN.

The Jurassic rocks of this area, though extremely rich in invertebrate fossils, more especially Mollusca, have nevertheless as yet yielded only very scanty remains of vertebrated animals. As to Reptiles, remains of *Ichthyosaurus* have been recorded by Professor Judd (22, p. 184), from the Upper Oolitic rocks of Eathie, near Cromarty, and of *Plesiosaurus* (*ib.* p. 182) from the Sutherland coast. Detached scales and bones of Ganoid fishes are occasionally met with, but the only two instances of these being perfect enough for determination and description are the following:—

Sub-class *TELEOSTOMI.*

Order **LEPIDOSTEOIDEI.**

Family **SEMIONOTIDÆ.**

Genus *SEMIONOTUS.*

Semionotus Joassi, *A. S. Woodward*, 1887.

Several specimens, one a nearly perfect fish, were found by the Rev. Dr. Joass in a block of carbonaceous shale, believed by him 'to have been derived from the bed underlying the main seam of lignite in Strath Brora.' If so, the fish is of Middle Oolitic age.

Doubts as to the accuracy of the generic reference in this case have been expressed by Deecke (Ueber Fische aus verschiedenen Horizonten des Trias, *Palæontographica*, vol. xxxv. 1888, p. 103), who considers the fish to be more allied to *Eugnathus* or to *Platysiagum*.[1]

Family **PYCNODONTIDÆ.**

Genus *GYRODUS*, *Agassiz.*

Gyrodus Goweri, *Egerton*, 1869.

Imperfect fish. Upper Oolite. Culgower, Sutherlandshire.

EXTINCT MAMMALIA OF THE MORAY FIRTH AREA.

After the deposition of the Upper Oolitic beds of the Sutherland coast comes another long interval of geological time, extending through the Cretaceous and Tertiary epochs to the Postpliocene, and for which the Moray area has nothing to show in the way of rock formations, though the occurrence of chalk flints in the drifts may point to the former existence of strata of that age.

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[1] Since the above lines have been in type, I have received Part iii. of Mr. Smith Woodward's 'Catalogue,' just published. The fish in question he mentions (p. 314) as 'closely resembling *Heterolepidotus*, but differing in not having the tail forked': stating also that 'its generic position must still be regarded as undetermined.'

The vertebrate remains which have been found in the superficial formations of this area are all of comparatively recent origin, and occur in the peat-bogs and surface-clays of the district. Of these, by far the most common are the horns of the Red Deer (*Cervus elaphus*), which have been frequently found at Little Ferry, Loch of Spynie, and other places, and of which many specimens, some of great size, may be seen in the museums at Elgin and Dunrobin.

Of Mammalia belonging to the human period now actually extinct in Britain, the list for this district which I have been able to get together is really very small, but such as it is I now present it.

Class MAMMALIA.

Sub-class *EUTHERIA*.

Order **UNGULATA.**

Sub-order *ARTIODACTYLA*.

Family **CERVIDÆ.**

Rangifer tarandus (*Linn.*). **Reindeer.**

Dr. J. A. Smith (65, p. 189) recorded the occurrence of fragments of horns in the Cill-Trolla Broch, Kintradwell, Sutherlandshire. These were discovered by the Rev. Dr. Joass, and identified by Sir Richard Owen.

Dr. Smith (66, p. 631) also mentions the discovery by the same investigator of a tine of a reindeer in a peat-moss in the Morbhaich Mor, near the town of Tain.

Alces machlis, *Ogilby*. **Elk.**

J. G. Phillips (67, p. 111, footnote) mentions the occurrence of a horn of this species in the Moss of Vantuck, which, he says, 'is in the possession of the Rev. J. Glennie, R.C. clergyman, Inverurie,' and 'was identified by Canon Greenwell, Durham.'

Family **BOVIDÆ.**

Bos taurus, *Linn.* **Ox.**

Var. *primigenius*, Bojanus. Large extinct British Ox.

Two horn cores were found at Westfield, New Spynie, in clay, six feet below the surface, and are now in the Elgin Museum (see 11,

p. 344). Vertebræ from Wester Alves are also in the Elgin Museum. Dr. J. A. Smith records bones attributable to this ox as having been found by the Rev. Dr. Joass in the Broch at Kintradwell in 1864 (66, p. 665).

VAR. *longifrons*, Owen. Small extinct British Ox.

Frontal portion of skull, with horn core, found by Dr. Joass at the Morbhaich Mor, and recorded by Dr J. A. Smith (66, p 631).

Order **RODENTIA.**

Sub-order *SIMPLICIDENTATA.*

Family **CASTORIDÆ.**

Castor fiber, *Linn.* **Beaver.**

Of the Beaver, the Rev. Dr. Gordon (68, p. 17) relates that 'the remains of this ancient denizen of Scotland were detected by Professor M'Gillivray in a parcel of bones sent to him by Admiral Duff of Drummuir from a small cave opened in a sandstone quarry on his property of Hopeman, and close by the southern shore of the Moray Firth, and little raised above high-water mark.'

Order **CARNIVORA.**

Family **CANIDÆ.**

Genus *CANIS.*

Canis lupus, *Linn.* **Wolf.**

No bones of the Wolf have, so far as I know, been found in this region, but there can be no doubt that it was in former times an inhabitant of this as well as of other parts of Great Britain. Traditions regarding the killing of wolves in the Moray Firth area are to be found in the second volume of Stuart's *Lays of the Deer Forests*, p. 245, and Dick Lauder's *Great Floods*, p. 22. In the last-named work the author says, in a footnote on the page quoted, 'Wolves are believed to have been extirpated in Scotland about the year 1680, but there is reason to suppose that they partially existed in remote districts considerably after that period.'

EXPLANATION OF THE PLATES.

PLATE I.

Pterichthys Milleri, Agassiz ; restored.

Fig. 1. Dorsal surface. Fig. 2. Ventral surface. Fig. 3. Lateral view.

PLATE II.

Fig. 1. *Diplacanthus striatus*, Agassiz ; restored.
Fig. 2. *Cheiracanthus Murchisoni*, Agassiz ; restored.
Fig. 3. *Dipterus Valenciennesii*, Sedgw. and Murch. ; restored.
Fig. 4. *Holoptychius Flemingii*, Agassiz ; restored.

PLATE III.

Fig. 1. *Gyroptychius microlepidotus* (Agassiz) ; restored.
Fig. 2. *Osteolepis macrolepidota*, Agassiz ; restored.
Fig. 3. *Diplopterus Agassizii*, Traill ; restored.
Fig. 4. *Cheirolepis Trailli*, Agassiz ; restored.

PLATE IV.

Fig. 1. *Coccosteus decipiens*, Agassiz ; restoration of skeleton.
Fig. 2. *Homosteus Milleri*, Traquair ; restoration of cranial buckler and dorsal plates.

PLATE V.

Asterolepis maxima (Agassiz) ; restored.

Fig. 1. Dorsal surface. Fig. 2. Ventral surface.

PLATE VI.

Fig. 1. *Psammosteus Taylori*, Traquair ; shield, rather less than one-half natural size. From Newton Quarry, in the Edinburgh Museum.
Fig. 2. —— —— Stellate ornament of the outer surface, magnified. Newton Quarry.
Fig. 3. —— —— Outer surface of the middle layer in a specimen, from which the outer layer has disappeared. Natural size, showing the honeycomb markings often seen in such cases. Newton Quarry.
Fig. 4. Portion of a *Psammosteus* spine, from Scaat Craig, in the collection of Mr. J. Grant of Lossiemouth. Natural size.
Fig. 5. Portion of the same spine magnified two diameters.

EXTINCT VERTEBRATA OF MORAY FIRTH AREA. PLATE I

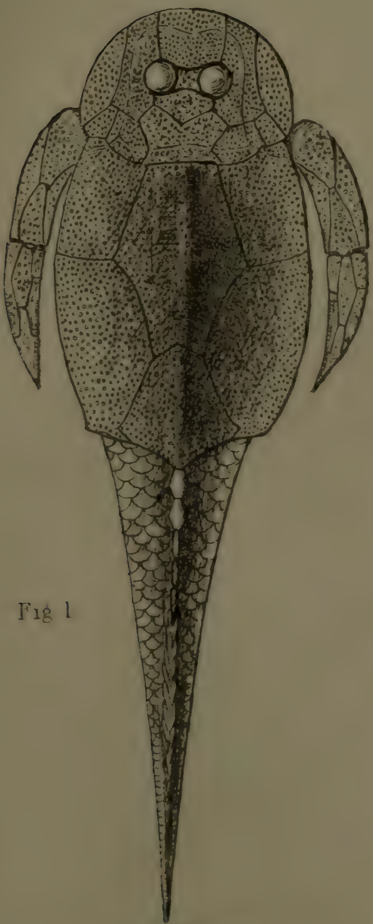
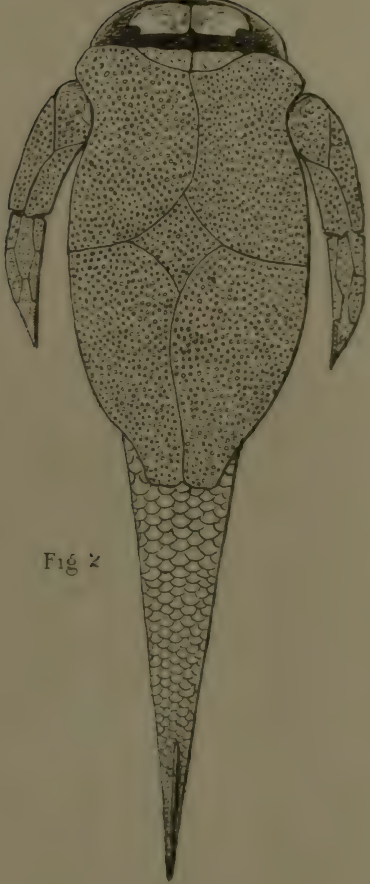


Fig 1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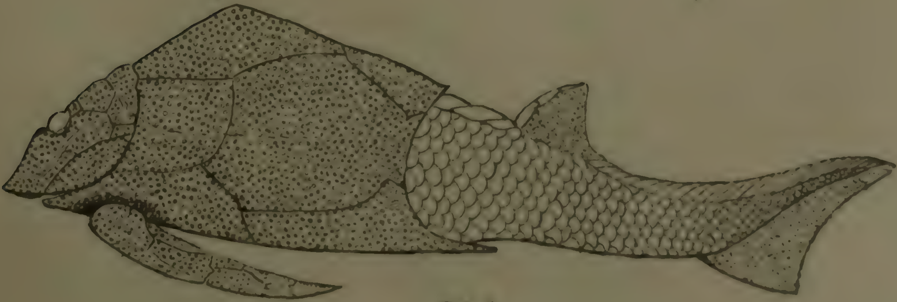


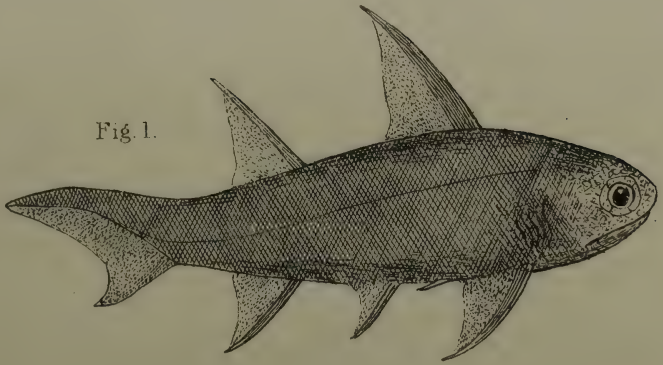
Fig. 3

R. H. Traquair, del.

McFarlane & Erskine Lithrs Edinr

PLATE II.

Fig. 1.



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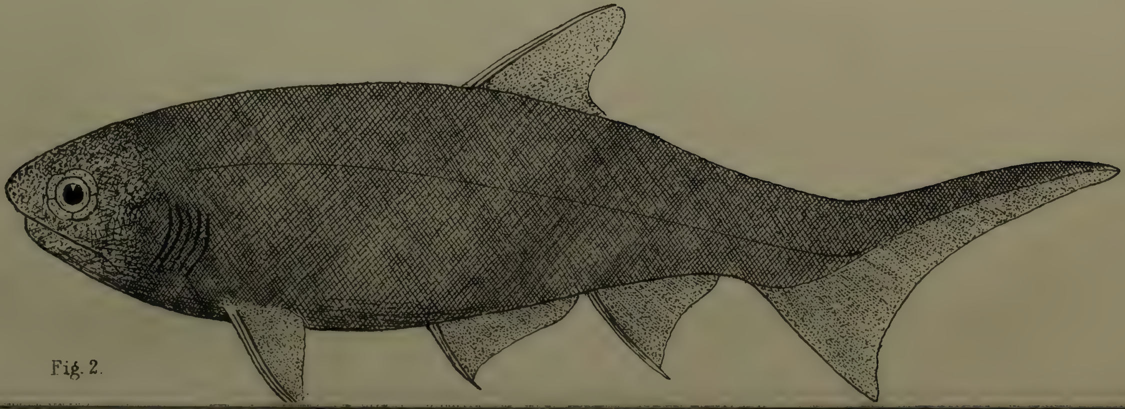

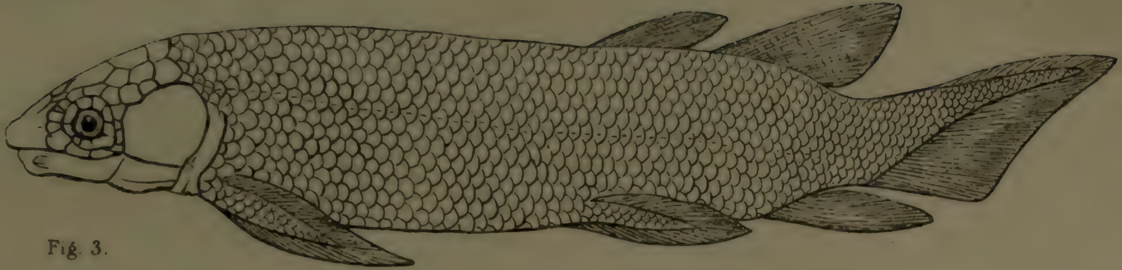

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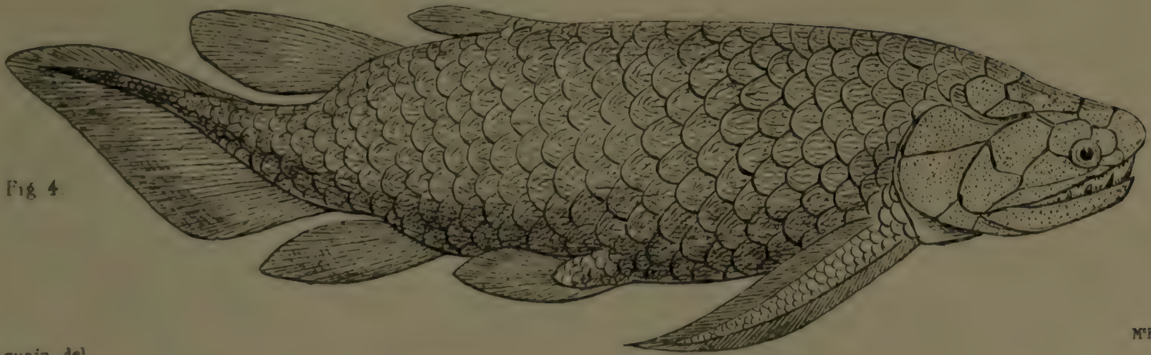
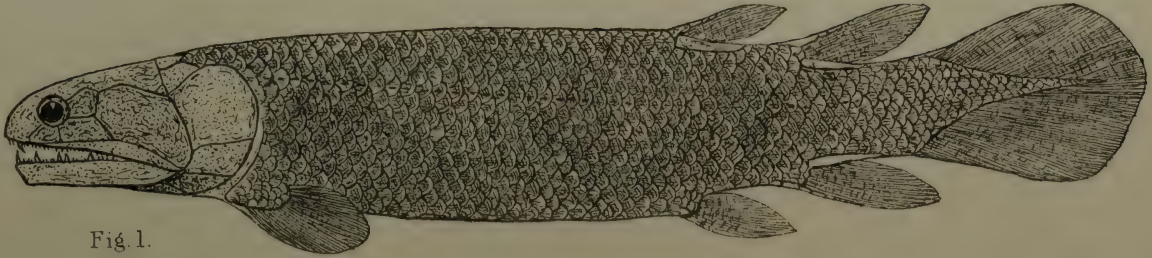


Fig 4.

R.H. Traquair, del.

McFarlane & Erskine, Lithrs Edinr



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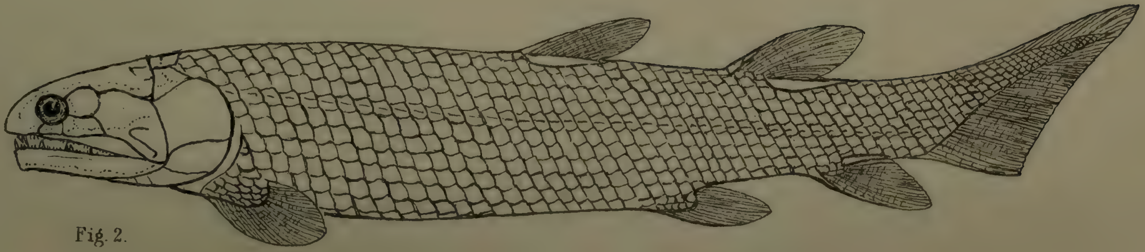

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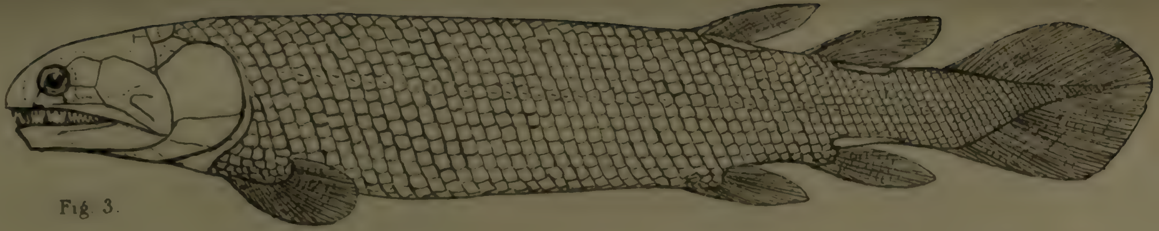

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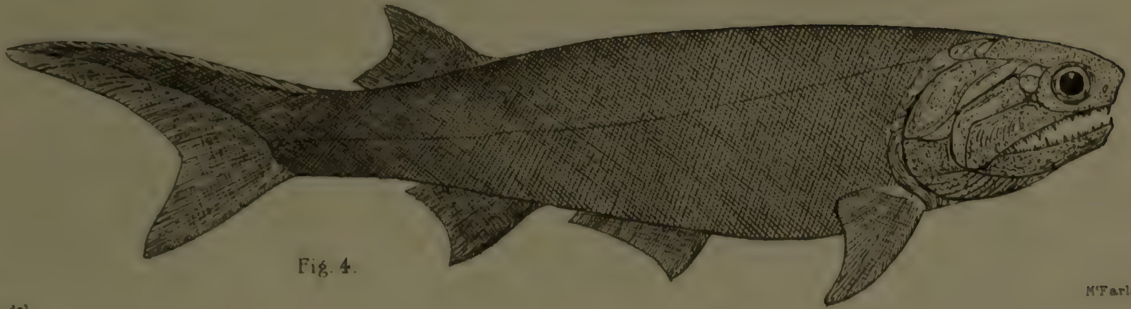
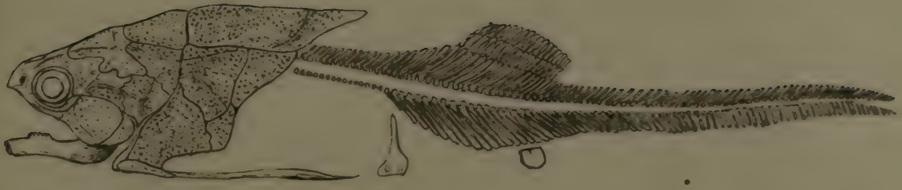


Fig. 4.

R. H. Traquair, del

M'Farlane & Erskine, Lithrs. Edinr.



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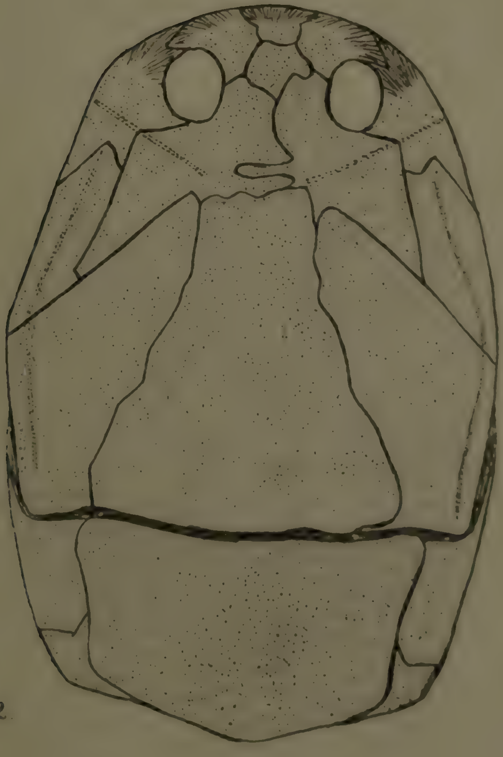
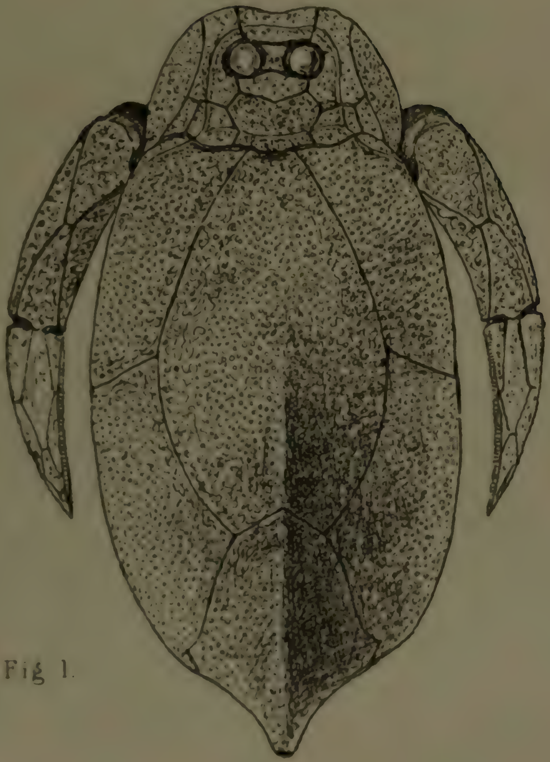


Fig 2.

R H Traquair, del

M'Farlane & Erskine Lith^rs Edin^r



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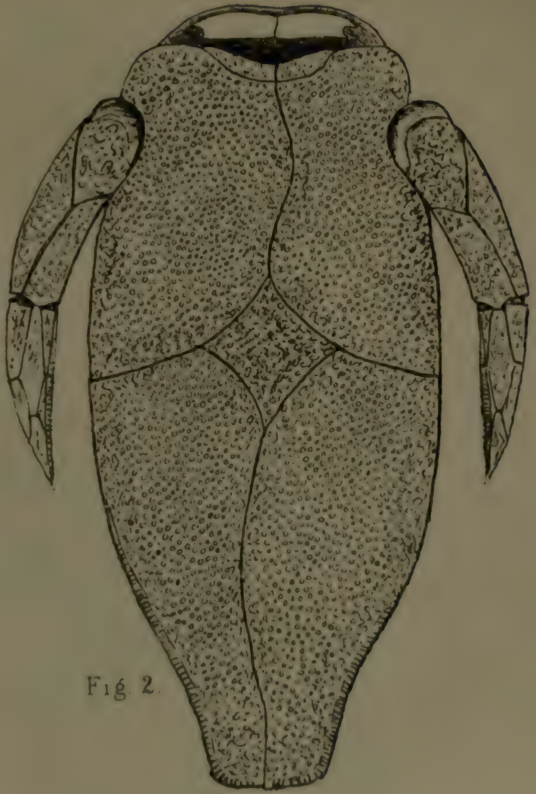

Fig. 2.

R. H. Traquair, del.

M'Farlane & Erskine, Lith^rs Edin^r

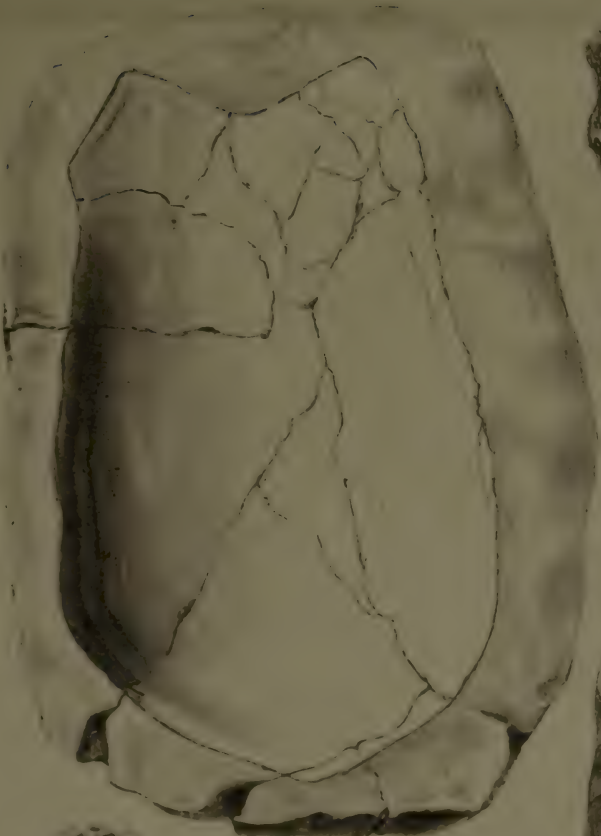

Fig 1

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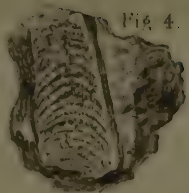

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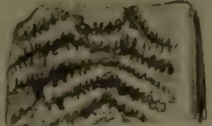

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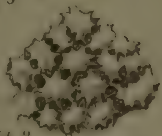

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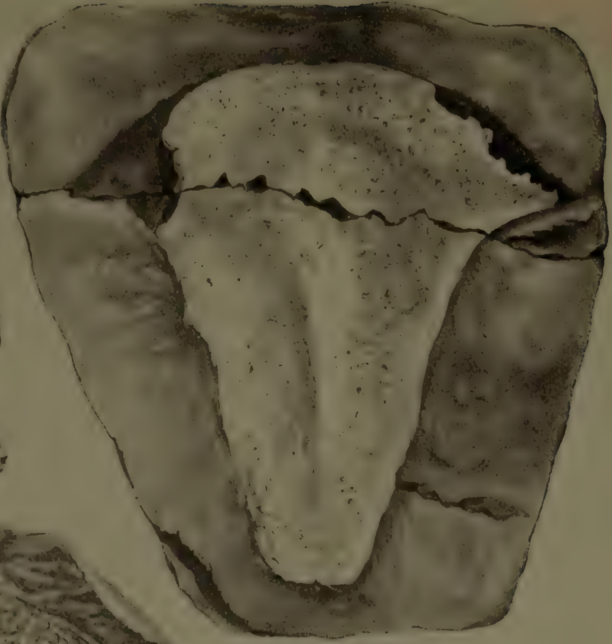

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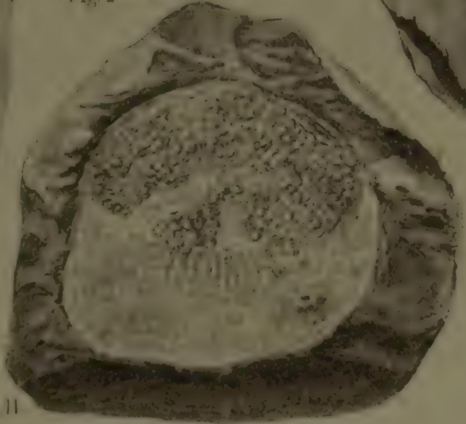

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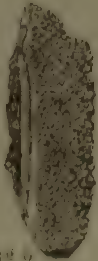

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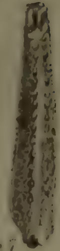

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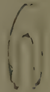
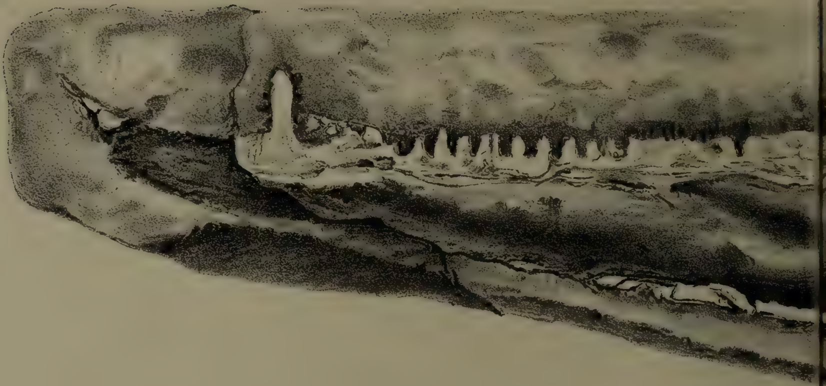


Fig 8

Fig 9

R H Traquair, del

McFarlane & Erskine, Lith^{rs} Edin^r



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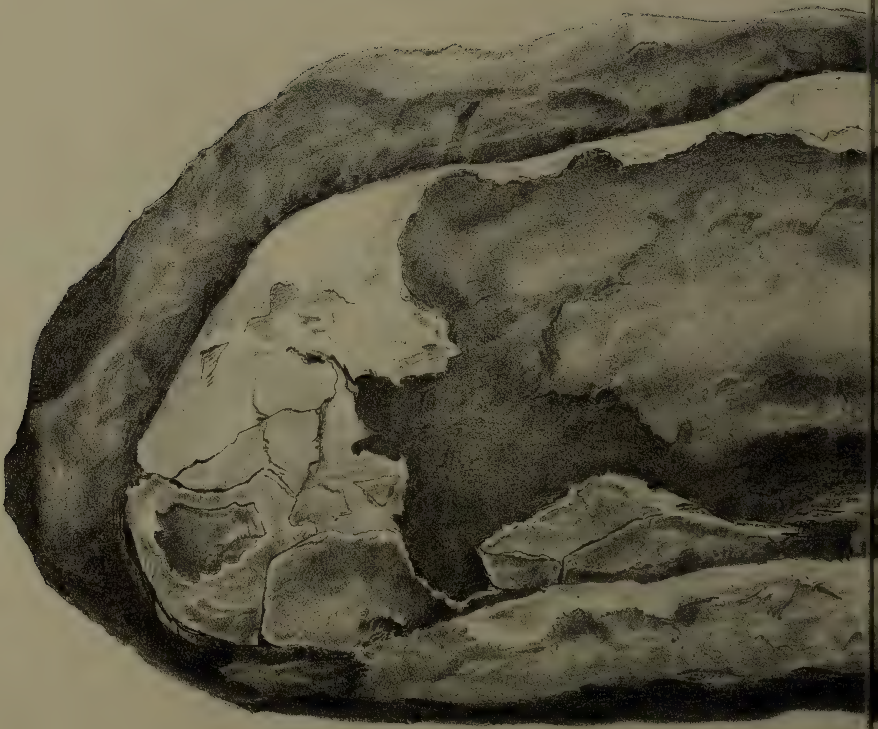

Fig. 2.

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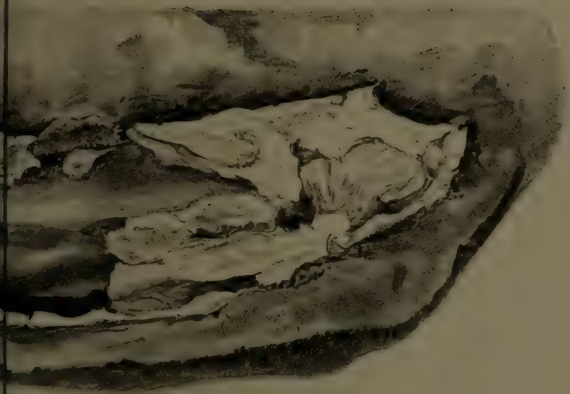
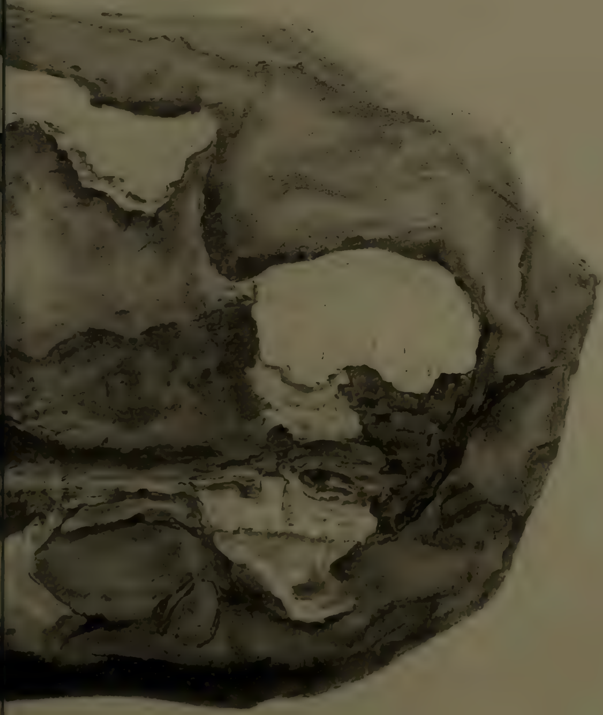
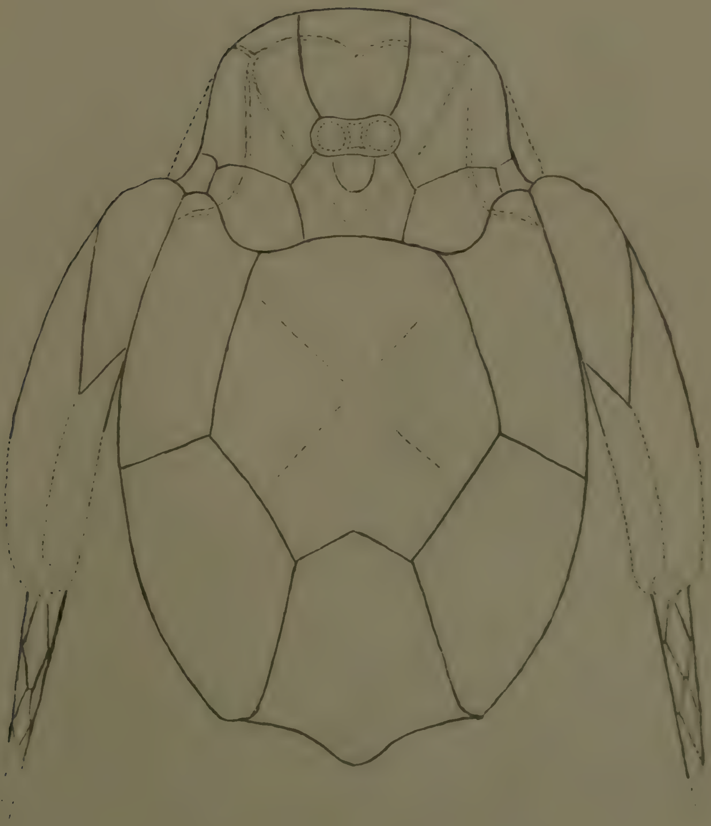




McFarlane & Erskine, Lithrs Edinr



R. H. Traquair, del.

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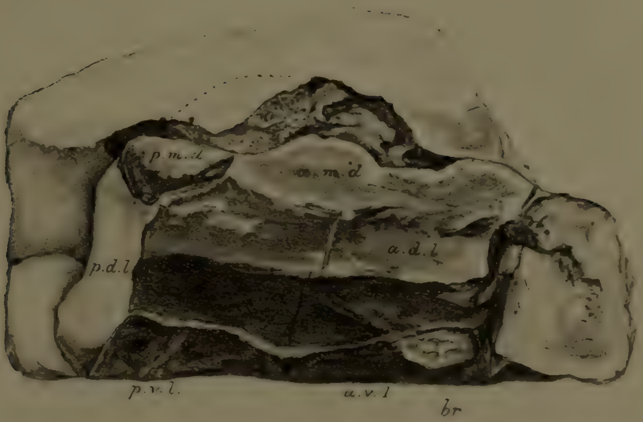
p.m.d
a.m.d
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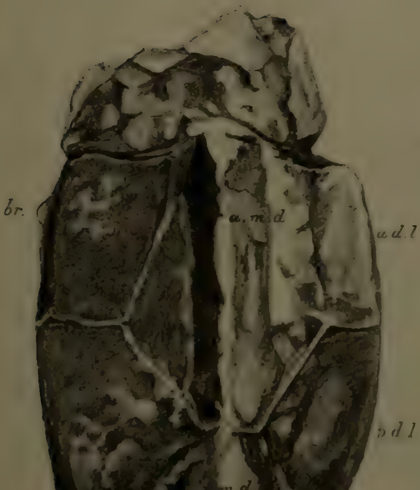
Fig. 1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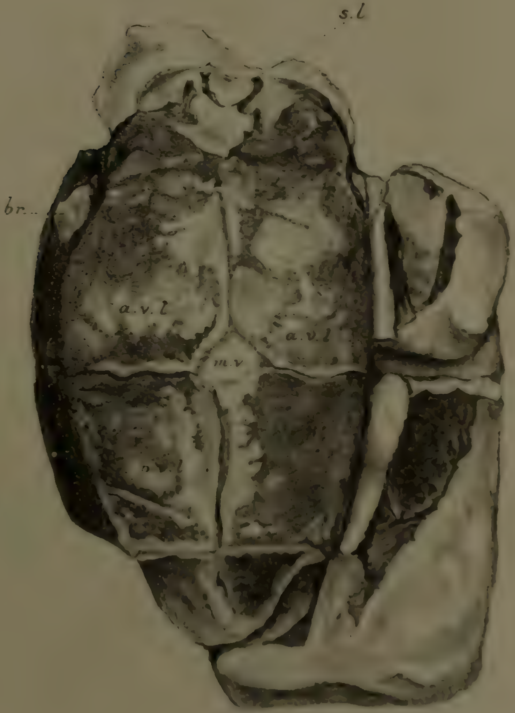
s.l
br.
a.v.l
a.v.l
m.v.
p.v.l.

Fig 3.

R. H. Traquair, del.

M'Farlane & Erskine Lith^{rs} Edin^{r}

Fig. 6. Portion of a spine of *Cosmacanthus Malcolmsoni*, Agassiz ; lateral view ; natural size. Scaat Craig.

Fig. 7. The same spine, external view.

Fig. 8. Outline of the transverse section of the proximal part of the same spine ; showing want of bilateral symmetry.

Fig. 9. Outline of the transverse section of the distal portion of the same spine ; showing internal cavity, and want of bilateral symmetry.

Fig. 10. Anterior median ventral plate of *Coccosteus magnus*, Traquair ; inner surface, natural size. Kingsteps, Nairn.

Fig. 11. Scale of *Holoptychius decoratus* (Eichwald) ; natural size. Kingsteps, Nairn.

PLATE VII.

Fig. 1. Mandible of *Polyplocodus leptognathus*, Traquair ; natural size. Kingsteps, Nairn.

Fig. 2. Palatopterygoid bone of *Polyplocodus leptognathus*, Traquair ; natural size. Kingsteps, Nairn.

PLATE VIII.

Restored outline of the dorsal surface of *Bothriolepis major* (Agassiz) ; surface ornament omitted.

PLATE IX.

Bothriolepis cristata, Traquair; natural size. From Rosebrae. In the Elgin Museum.

Fig. 1. Right lateral view. *a.m.d.* anterior median dorsal plate ; *p.m.d.* posterior median dorsal ; *a.d.l.* anterior dorso-lateral ; *p.d.l.* posterior dorso-lateral ; *a.v.l.* anterior ventro-lateral ; *p.v.l.* posterior ventro-lateral ; *br.* articulation of right arm.

Fig. 2. The specimen removed from the matrix ; dorsal view. Lettering as above, but *br.* here shows the articulation of the *left* arm.

Fig. 3. The specimen replaced in the matrix, which shows the greater part of the left arm. *a.v.l.* and *p.v.l.* anterior and posterior ventro-lateral plates ; *s.l.* semilunar ; *m.v.* median ventral.

ANALYSIS OF THE MAMMALIAN AND AVIAN FAUNA

TO WHICH ARE ADDED NOTES RECEIVED SINCE THE LISTS WERE PRINTED OFF.

WE have considered that an analysis of the MAMMALIAN and AVIAN FAUNAS of Moray may be of considerable usefulness as a chapter in our volumes.

For our list of Mammals we have used the 2nd edition of Bell's *British Quadrupeds*, that being the best work on the subject, though in many respects, and more especially as regards the micro-mammalia, it is in need of revision, to bring it down to the date of our present knowledge.

Of the *eighty-one* species of Mammals which inhabit Great Britain, *forty-two* have been recorded from the Moray Basin area; but we have little doubt that further research would add one or two species of BATS to the list.

Of CETACEANS little can be said; they are great wanderers, and it is only by chance that such can be observed, or perhaps occur even, on a strip of *deep* sea so comparatively small as that which fringes the Moray area. Could their habits, however, be as easily studied as those of birds, possibly it might be found that, like them, individuals migrate regularly, using the same routes year after year.

A comparison of the numbers from each ORDER shows, that of the CHEIROPTERA, Moray possesses only three species, viz., the *Pipistrelle*, *Daubenton's*, and the *Long-eared Bats*, out of the fourteen species recorded as British.

Of the INSECTIVORA, the whole British list is represented, viz., the *Hedgehog*, *Mole*, *Common*, and *Lesser*, and *Water Shrews*.

Among the eight British CARNIVORA (including the *Beech* and *Pine Martens* as one and the same), all are found in Moray, viz., the *Wild Cat*, *Fox*, *Marten*, *Weasel*, *Stoat*, *Polecat*, *Otter*, and *Badger*.

Bell gives six species of Pinnepedia (Seals), and of these Moray only possesses three, viz., the *Common*,[1] *Greenland*, and *Great Grey Seals.*

Of the twenty-one species of CETACEA recorded by Bell (from which the *Greenland Right Whale* may possibly be excluded) only eight have been noted. These are the *Common* and *Sibbald's Rorquals*, the *Humpbacked, Bottlenose, Sowerby's, White,* and *Pilot Whales*, and the *Porpoise.*

Out of the four species of UNGULATA three occur in *Moray*, viz., the *Red-, Fallow-*, and the *Roe-deer* (the other—*Bos taurus*—being extinct).

Thirteen species of RODENTIA inhabit Britain, and of these no less than twelve are found in Moray. These are the *Squirrel, Harvest Mouse*,[2] *Wood Mouse*, and *Common House Mouse*; the *Black Rat* (probably now extinct), *Brown Rat, Common* and *Bank Voles, Water Vole, Common* and *Mountain Hares*, and the *Rabbit.*

AVES.

With the Birds we find greater difficulty in making an analysis. Not only is the number of species far greater, but most of them are more or less migratory; and the difficulty lies in classifying them under their respective headings. We have endeavoured to do so, however, in somewhat more minute detail as to *Faunal Values* than is usually attempted. This analysis of the bird-fauna can only be thoroughly understood and appreciated after reading the text, and comparing the text with the analysis. We have used Saunders's List of British Birds, being the latest authority to date.

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[1] A Common Seal forced its way up the Findhorn river on 26th October 1895, and was shot by James, son of Brown of Forres: it measured 3 feet 6 inches in length, and has been preserved by his father. The river watcher, Mr. Percie, told Brown he had never seen a Seal so far up the river before (James Brown, *in lit.* 3rd December 1895).

[2] Since the mammalian portion of our Fauna was printed off, we find that Mr. J. E. Harting records that Mr. Small of Edinburgh received two specimens 'many years ago' from Banffshire, presumably from Edward; but upon questioning Mr. Small lately, he could not remember the fact, though he remembered receiving three in the flesh, but whence he could not recollect. The identification, however, of the species by Mr. Sim seems sufficient to warrant the species being included, though it is difficult to say whether its presence in the Moray Firth districts may not have been due to accidental introduction by vessels trading to the port of Banff. We can hardly accept it meanwhile as a native. Mr. Harting's reference is in the *Zoologist*, November 1895, p. 491. Mr. Sim agrees with us that the Greenscares example may have been brought in a cereal-laden ship. He adds, only one other instance is known to him in 'Dee,' on the authority of the late Mr. S. Burnett at Kemnay (Aberdeenshire).

We have divided the different *Faunal Values* of the various species under the following heads, viz. :—

RESIDENT, SUMMER VISITANTS, WINTER VISITANTS, AUTUMN and SPRING MIGRANTS, OCCASIONAL—*i.e.* IRREGULAR VISITANTS, DOUBTFULLY-RECORDED species, INTRODUCED and ESCAPED species (the latter being, as may be understood, such as have escaped from confinement or from private ornamental waters), and species which OCCASIONALLY NEST.

RESIDENTS are those species which remain the whole year round, and breed regularly in some part or parts of the area, it may be even in only one locality.

SUMMER VISITANTS are such as nest regularly, but are only within the area during the breeding season.

WINTER VISITANTS are those that remain all winter, arriving in autumn, and leaving in spring.

AUTUMN and SPRING MIGRANTS are those that occur on either or both migrations, but not at other times.

OCCASIONAL VISITANTS occur at irregular, or to us, at present, from unaccountable reasons.

DOUBTFULLY RECORDED species are such as have been included on insufficient data, or the specimens or history of which have been lost.

INTRODUCED species (not naturalised like the *Pheasant*) are those which have been introduced of late years. This also embraces ESCAPED species, as we have already indicated.[1]

Species that NEST OCCASIONALLY, sometimes in considerable numbers, but are, as yet, not known to breed regularly.

Some of the birds mentioned in our analysis will be found under more than one heading. Thus the *Short-eared Owl* will be found as OCCASIONALLY NESTING, and also as an AUTUMN VISITANT. Further search may prove that it nests more regularly, or is an increasing or decreasing species, but our present knowledge shows it to be more truly an Autumn Visitant than one which is found at any other season.

---

[1] It is much to be desired that those who possess aviaries or ornamental waterfowl, or even caged birds, anywhere in Scotland, should give notice of 'Escapes,' and also furnish lists of species which may occupy any locality in a semi-domesticated state, and such data as time of introduction, and details of nesting, and of increase or decrease at the said localities. While interesting in themselves, such details, if duly recorded, would often save much uncertainty, trouble, and confusion to the recording naturalists working at our native fauna.

Where, however, any species occurs under more than one heading, it will be placed in brackets, so as to avoid being counted over more than once in the final additions.

When further short notes are considered of sufficient interest in the following analysis, such will be inserted in footnotes and smaller type, and by this means another Appendix to our text will be found unnecessary.

RESIDENTS.

Missel Thrush.
Song Thrush.[1]
Blackbird.
Stonechat.
Redbreast.
Golden-Crested Wren.
Hedge Sparrow.
Dipper.
Long-tailed Tit.
Great Tit.[2]
Cole Tit.
Marsh Tit.[3]
Blue Tit.
Crested Tit.[4]
Wren.
Tree Creeper.
Pied Wagtail.[5]
Grey Wagtail.[6]
Meadow Pipit.
Rock Pipit.
Greenfinch.
Siskin.
House Sparrow.
Tree Sparrow.[7]
Chaffinch.
Linnet.
Lesser Redpoll.
Twite.
Bullfinch.
Crossbill.
Corn Bunting.[8]
Yellow Bunting.
Reed Bunting.[9]
Snow Bunting.[10]
Starling.
Magpie.
Jackdaw.
Raven.
Hooded Crow.
Carrion Crow.[11]
Rook.
Skylark.[12]

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[1] In Sutherland birds on migration are smaller and darker.

[2] Northern breeding limit presently ascertained—S.E. Ross-shire.

[3] Hinxman writes to us (25/xi/95):—'Marsh Tits are very numerous about Kincraig this autumn. I see a dozen for one I saw in the breeding season, and am inclined to think that this is not solely due to the ordinary autumn flocking together, but that there is a certain amount of migration from other parts.' Mr. Sim is positive as regards the rarity of this species in 'Dee.'

[4] As early as 1816, Mr. W. E. Leach, the then keeper of the Zoological Department of the British Museum, obtained a specimen of the Crested Tit from Dr. Latham: *loc.* 'Scotland.' 'The Willoughby Society,' Leach's *Systematic Catalogue*, p. 17.

[5] Rarer in the Sutherland portion in winter.

[6] Rarer in Sutherland in winter. Occurs inland in summer, and shoreward in winter.

[7] Local or sporadical.

[8] Rarer in Sutherland in winter.

[9] Local. Shifting ground in winter.

[10] Some are resident, others come in winter.

[11] The latter form is quite rare in Sutherland.

[12] Rarer in the northern parts of the area in winter.

Barn Owl.
Long-Eared Owl.
Tawny Owl.
Hen Harrier.
Buzzard.
Golden Eagle.
Sparrow Hawk.
Peregrine Falcon.
Merlin.
Kestrel.
Cormorant.[1]
Shag.[2]
Common Heron.
Shielduck.
Wild Duck.
Shoveller.
Teal.
Wigeon.
Pochard.[3]
Goosander
Red-breasted Merganser.[4]
Woodpigeon.
Stock Dove.[5]
Rock Dove.
Black Grouse.
Red Grouse.
Ptarmigan.
Pheasant.
Partridge.
Moorhen.
Coot.
Ring Plover.
Golden Plover.
Lapwing.
Oyster-Catcher.
Woodcock.
Snipe.
Dunlin.
Redshank.
Curlew.
Black-headed Gull.
Common Gull.
Herring Gull.
Great Black-backed Gull.
Black-throated Diver.[6]
Red-throated Diver.[7]
Little Grebe.[8]

The following sea-birds or rock-birds may most justly be classed as summer visitants, but as they are often observed either out at sea, on the coast, or far inland after severe gales of wind from the east, may also by some be held to hold an intermediate value between residents and summer visitants.

Razorbill. Guillemot. Black Guillemot.[9] Puffin.

---

[1] One frequented Lochs an Eilein and Gamhna for some days in September 1895 (Hinxman).

[2] Does not breed, but young are seen on the coast all the year round. Though stated to breed in certain caves of the north coast of Aberdeen, this is by no means certainly recorded.

[3] Rarer in winter.

[4] Goosanders and Mergansers were seen on Spey and Loch Inch throughout October and early part of November, but had left by 25th November (Hinxman). They repair to tidal reaches in most cases, but a few remain inland even in winter.

[5] The Stock Dove is distinctly migratory, spreading over the country till autumn, when the greater number leaves, but there is sufficient evidence to show that it occasionally occurs in winter.

[6] Resident, but migrating from inland localities to the sea; rare in winter in the Moray Firth and to the north of it.

[7] Same as foregoing, but does not breed nearly so far south.

[8] We have lately learnt from Captain Dunbar-Brander that the pike have almost died out of Loch Spynie, and that the Little Grebes are again increasing.

[9] Of doubtful occurrence now as a breeding species, although certainly it did at one time nestle in the Aberdeenshire part of the area.

REGULAR SUMMER VISITANTS.

Ring Ouzel.
Wheatear.
Whinchat.
Redstart.
Whitethroat.
Chiffchaff.
Willow Wren.
Wood Wren.
Sedge Warbler.
Tree Pipit.
Spotted Flycatcher.[1]
Swallow.[2]
House Martin.[2]
Sand Martin.
Swift.[3]
Nightjar.
Cuckoo.
Osprey.[4]
Greylag Goose.[5]
Quail.
Landrail.
Dotterel.
Common Sandpiper.
Greenshank.
Common Tern.
Arctic Tern.
Lesser Tern.
Lesser Black-backed Gull.[6]
Kittiwake.

REGULAR WINTER VISITANTS.

Redwing.[7]
Fieldfare.[7]
Brambling.[8]
Short-eared Owl.
Gannet.[9]
White-fronted Goose.[10]
Bernacle.[11]
Brent Goose.[12]
Whooper.
Bewick's Swan.
Pintail.
Scaup.

---

[1] Mr. J. Young informs us that the date on which he saw and heard this bird *singing* was the 29th May 1885.

[2] Rare in East Sutherland.

[3] In 1895, as we are informed by Brown of Forres, there appeared to be a falling off in the numbers of the Swift usually seen in Forres. He says :—'They have left their old nesting-place over my shop-window, where they bred for many years. They did not breed there last season (1894) nor this. These birds have been getting scarcer during the last two or three years.' At Drachlaw, Harvie-Brown observed none up to the 16th May 1895. [Read also the interesting notes in Appendix, by W. Laidlaw.]

[4] The Ospreys left earlier in 1895, about August 23rd (Hinxman).

[5] Breeds in the northern parts, but is only a visitant to the south.

[6] A few may now and then remain through the winter, but we have every reason to believe that this is their farthest northern range at that season.

[7] Both Redwing and Fieldfare are absent from the extreme north of Moray in midwinter.

[8] Common in autumn and spring, rarer in winter.

[9] Passes towards the north, never repasses to the south. Local movements regulated by the migrations of the herring.

[10] Local in appearance.

[11] Rare.

[12] In MacGillivray's time frequented the Moray Firth in thousands (*sic*); v. *B.B.*, vol. i. p. 49.

Golden Eye.[1]
Long-tailed Duck.
Tufted Duck.
Common Scoter.[2]
Velvet Scoter.
Water Rail.
Turnstone.[3]
Jack Snipe.
Purple Sandpiper.[4]
Knot.
Bar-tailed Godwit.[4]
Glaucous Gull.
Iceland Gull.
Little Auk.
Great Northern Diver.
Sclavonian Grebe.

AUTUMN AND SPRING MIGRANTS.

(Fieldfare, *Aut.* and *Sp.*)[5]
(Redwing, *Aut.* and *Sp.*)[5]
(Short-eared Owl, *Aut.*)
Bean Goose, *Sp.* and *Aut.*
Pink-footed Goose, *Sp.*[6]
(Tufted Duck.)[7]
Grey Plover.[8]
Little Stint, *Aut.*
Curlew Sandpiper, *Aut.*
Sanderling, *Aut.*
Ruff, *Aut.*
Whimbrel, *Aut.* and *Sp.*
Richardson's Skua, *Aut.*

OCCASIONAL

at any season of the year, but principally in Spring (*Sp.*), Summer (*S.*), Autumn (*Aut.*), or Winter (*W.*). Where no season is indicated, the species has only occurred on one or two occasions, or otherwise very irregularly—*i.e.* at different seasons of the year.

Red-spotted Bluethroat.[9]
Blackcap, *S.*, *Aut.*, *W.*
White Wagtail, *Sp.*[10]
Grey-headed Wagtail.[11]
Yellow Wagtail, *Sum.*[12]
Great Grey Shrike, *W.*
Waxwing, *W.*
Pied Flycatcher, *Sp.*[13]
Hawfinch (*auct.* St. John).
Mealy Redpoll.

[1] Often remains late into spring and early summer in the forest tracts of Spey.

[2] Occasionally nesting.

[3] Often remains late into summer.

[4] Has been observed late into summer and in breeding dress.

[5] More common in Aut. and Sp. than W.

[6] Regular, or locally in spring, rarely in autumn.

[7] Autumn and spring visitant; very rare and local in the Moray Firth area in winter; is believed to have bred. We believe this species to be of comparative rarity in tidal estuaries at any great distance from its breeding haunts, but as new breeding haunts are taken up in new districts, its naturally sedentary habits prevent long flights, and when frozen out of fresh-water localities, it betakes itself to the nearest tidal creek or estuary. Just as this Analysis is being marked 'Press,' a Tufted Duck has been sent us by Captain Dunbar-Brander, from Pitgaveny, Elgin, being about the fourth example ever obtained there. Vide *Annals of Scott. Nat. Hist.*, Jan. 1896.

[8] Autumn; rare in winter.

[9] Only once seen in 1890: no specimen obtained.

[10] Local. Booth only.

[11] One shot by J. G. Millais, 1891; wrongly bracketed in text.

[12] Booth.

[13] Once seen by Booth in Strathspey in May 1868.

Rose-coloured Starling.
Chough.
Nutcracker.
Jay.[1]
Wryneck.[2]
Great Spotted Woodpecker.
Kingfisher, *S.*, *Aut.*[3]
Roller, *S.*, *Aut.*
Hoopoe, *S.*
Snowy Owl, *W.*
Scops-eared Owl.
Eagle Owl.[4]
Rough-legged Buzzard, *Aut.*
Red-shouldered Hawk.[5]
White-tailed Eagle, *W.*
Goshawk.
Kite.
Honey Buzzard, *S.*, *Aut.*[6]
Greenland Falcon.
Iceland Falcon (?).
Hobby.
Purple Heron.
Bittern.
American Bittern.
Ruddy Sheldrake.
Gadwall.
Garganey.
White-eyed Duck.
Eider Duck.
Smew, *W.*
Turtle Dove, *S.*
Pallas' Sand Grouse.[6]
Spotted Crake.
Little Crake.
Crane.
Great Bustard.
Little Bustard.
Avocet.
Grey Phalarope, *W.*
Red-necked Phalarope.
Great Snipe.
Green Sandpiper.
Spotted Redshank.[7]
Black-tailed Godwit.
Little Gull.
Ivory Gull.
Pomatorhine Skua.
Buffon's Skua.
Great Crested Grebe.[8]
Eared Grebe.
Fulmar Petrel.
Storm Petrel.

INTRODUCED SPECIES.

Capercaillie.[9]
(Pheasant.)
Reeves' Pheasant.
Red-legged Partridge.
(Quail.)[10]
Wild Turkey.
Francolin.
Virginian Colin.[11]

---

[1] Mr. Charles Dixon in his *Migration of British Birds* says :—'The Jay has extended its range northwards within a comparatively recent time, and now breeds at least as far north as Inverness.' So far he is probably correct, but Inverness-*shire* is a large county, and embraces both sides of the watershed. As we have indicated in the text, we are not aware of its having established itself anywhere north of the Grampian Mountains.

[2] We here query Hoy's record of January 12th (1814).

[3] Probably breeds, but its favourite food—minnows—are somewhat scarce anywhere in the area, and entirely absent in streams north of the Caledonian Canal and Inverness.

[4] *Auct.* St. John.

[5] *Ibis*, 1865, p. 549.

[6] See Occasionally Nesting.

[7] Wrongly bracketed in text.

[8] One shot on river Ness, December 1895.

[9] Introduced, acclimatised, and also strayed. Now believed to be again extinct.

[10] Once introduced at Balnagown.

[11] Introduced at Ballindalloch, 1844. A specimen in the Elgin Museum, No. 88, presented by T. Macpherson Grant, Esq. None of the three last species, nor the Reeves' Pheasant, are included in the British List of Birds.

ESCAPED SPECIES.

Red-winged Starling.[1]
Egyptian Goose.
Canada Goose.[2]
Mute Swan.[2]
Purple Gallinule.

SPECIES OF DOUBTFUL SPECIFIC VALUE.

Polish Swan.
Bimaculated Duck.

FORMERLY NESTING.

The following species have been known to nest commonly in former years in the area of Moray, but now no longer do so, or at least in very rare instances. Those marked * are known to do so no longer.

Goldfinch.
*(Great Spotted Woodpecker).
(Hen Harrier.)
(Buzzard.)
*(White-tailed Eagle.)
*(Goshawk.)
*(Kite.)

OCCASIONALLY NESTING.

Some species, although they occur more or less commonly on migration, are only known as yet occasionally to nest in the Moray area; others may not even be regular migrants, but irregular or spasmodic, or even only occasional visitants.

---

[1] But see our volume on *Argyll.*

[2] Although both the Canada Goose and Mute Swan are included under the above heading, we are inclined to consider them, in some instances at least, as really wild birds. The Canada Goose is an extremely abundant species in autumn on the shores and bays of New Brunswick, Canada. The Mute Swan also is (or was in 1868) very abundant in the south of Sweden, collecting in hundreds in the bays and shallow creeks around Malmö and Falsterbö—the extreme southern point of Sweden. They collect there during the moulting season, and many were unable to fly in October; and a man in a light punt, and by rowing hard, could overtake and kill them with an oar. This is our own personal experience (T. E. B.), and there seems no reason why some at least of these should not accompany the families of Whoopers which begin to come down to these same localities at the end of October.

(Blackcap.)
(Pied Flycatcher.)[1]
(Short-eared Owl.)[2]
(Honey Buzzard.)[3]
(Tufted Duck.)
(Common Scoter.)[4]
(Pallas' Sand Grouse.)
Sandwich Tern.[5]
Roseate Tern.
(Richardson's Skua.)[6]

OF DOUBTFUL RECORD.

[*Square brackets in text.*]

Black Redstart.
Lesser Whitethroat.
Garden Warbler.
Richard's Pipit.
Red-backed Shrike.
White-winged Crossbill.
Wood Lark.
Lesser Spotted Woodpecker.
Bee Eater.[7]
Little Owl.
Marsh Harrier.
Montagu's Harrier.[8]
Glossy Ibis.
Spoonbill.
Hooded Merganser.
Black-winged Stilt.
Red-breasted Snipe.
Temminck's Stint.
Wood Sandpiper.[7]
Black Tern.
Caspian Tern.
Sabine's Gull.
Bonaparte's Gull.
Great Skua.
Great Shearwater.
Dusky Shearwater.

SUMMARY.

N.B.—Bracketed entries are not counted in the total in the following Summary, as they will have been included in those lists where they appear unbracketed.

---

[1] Breeds in one locality only.

[2] May once have nested regularly, but we have no information.

[3] Nested on one occasion.

[4] In one locality only.

[5] On September 11th, 1895, Brown of Forres saw three Sandwich Terns at the shore near that town. These were probably on their return journey southward. Hitherto this has been a very unusual sight.

[6] One pair in one locality only.

[7] Square brackets omitted in text.

[8] At p. 45 of vol. ii. '(see our remarks in the *Fauna of Sutherland and Caithness*),' these really refer to the Marsh Harrier.

Of the **360-70** species included in various Lists of British birds, **255** have a place in our volumes, and these are classed as under:—

92		Residents.
29		Regular Summer Visitants.
28		„ Winter Visitants.
9	(+4)	„ Autumn and Spring Migrants.
62		Occasional Visitants.
2	(+6)	Acclimatised Species, or attempted as such.[1]
2	(+3)	Escapes from confinement.[2]
2		Species of doubtful specific value.
1	(+6)	Formerly nested, but no longer do so.
2	(+8)	Only, as yet, occasionally nest.
26		Recorded on insufficient evidence.
255		

These numbers can only be taken as approximate. Owing to preservation or persecutions some species are still increasing or decreasing, according to whether they come under one head or the other. Besides, we have reasons for believing that the Moray Firth is the farthest northern winter range of certain species, though further observation and time alone can actually prove this, and such an analysis as this must be tentative in many details.

---

[1] Introduced species in text. Four of these are not included in British lists.

[2] Four of these are not included in any British list; but see our footnote on Canada Goose and Mute Swan.

APPENDIX

SINCE our volumes were put in type, we have been favoured with the sight of some MS. notes by the late William Laidlaw, the well-known author of the beautiful song 'Lucy's Flitting,' and the friend, factor, and amanuensis of Sir Walter Scott. As a few of these notes bear on the Natural History of our present area, we have thought them worthy of mention here, as they refer to birds actually seen by him, which now rarely, if ever, occur there.

William Laidlaw was a Border man, but after the death of Sir Walter Scott he left Kaeside, where he at that time resided, on the Abbotsford estate, and became manager on the estate of Coul, Ross-shire, afterwards going in the same capacity to Balnagown; he died at Marybank, near Balnagown, in May 1845. Mr. Laidlaw was, judging from his notes, an observer in every branch of Natural History, and appears to have kept notes more or less regularly all the time he was in the north, but only a very few of these are of present interest. He contributed several articles to the *Annals and Magazine of Natural History*, under the initials W. L., Selkirkshire. In justice to Mr. Laidlaw we must mention that these notes were copied straight out of his note-books, and were never intended for publication in their present uncorrected form.

'One of the branches of the river Beauly or Glass, between Inverness- and Ross-shires, forms an alpine valley about twenty-five miles in length, surrounded by rugged conical mountains, upon which the snow often lies until the month of August. Two narrow lochs through which the stream flows that descends from this glen, extend together and fill almost twelve miles of its length. The whole was, in former times, one continued forest of natural fir (*Pinus sylvestris*), which for many centuries furnished timber for the boats, and roofs for the cottages, for the south-western part of Ross and the isle of Skye, and for sixty years, until lately, it has been cut and floated to the Beauly Firth, so that now the extent of the forest (in that valley) is almost confined to the banks of these lochs, but still, for about three-quarters of a mile in breadth, it covers the sloping foot of the mountains on the southern side, and forms one of the most extensive pine forests in Scotland. Through this the traveller has to fight his way by a trail—broken, rough, and circuitous in a strange degree, and so encumbered by rocks and insulated masses of granite and huge tortuous roots of trees, that a stranger from the Lowlands, and without experience in such districts, finds it not a little difficult to persuade himself that he is not in some strange and savage country.

'It was my fortune to pass through, for the first time, alone, and in the close of the evening, and will not likely forget the impression. The trees having all been cut over below the main branches, and these being often of great size, and left to remain where they fell, and the timber being of the hardest and most imperishable kind, the ruins of a hundred years, small and large, of decay were crowding the intervals between the standing trees, until of late, stripped of their bark by time, and bleached white by the stormy weather, they looked like the ribs and bones of immense animals, the owners of which had long perished from the earth. Moreover, as none of the hollow or diseased (crooked) trees had ever been cut, these had died, and their grey and fantastic form added very much to the loneliness and dreariness of this strange scene of desolation.

'Since that time it happened to me to be upon one of these lochs in a boat, and, while observing the grandeur of such a mass of gloomy forest, and the effect of the broad masses of light and shade, varying from tufted ridge to hollow glen, I was greatly surprised to observe hundreds of Swifts (*Hirundo apus*) skimming over the tops of the trees, after their usual manner while hunting for flies. No old castle was nearer than thirty miles, and as Inverness was more than forty—the only place indeed from which I could suppose such an unusual number to come from,—I was forced to conclude that city to be their home, and was musing upon the remarkable power of locomotion peculiar to these birds and the enjoyment arising from it—for I considered that twenty or thirty minutes of their ordinary rate of flying would carry them to their roost,—when the noise of a woodpecker, seeking his sustenance after quite a different manner, drew an observation from one of my friends, a resident in the neighbourhood. He remarked that the loud tapping of the woodpecker was not so often heard when they were searching the bark for insects, as when they were boring holes in the large decayed trees in which they made their nests, and that it was generally said that they never made use of an old hole, but gave themselves the trouble of perforating a new one every time they hatched. It immediately occurred (to me) that the prodigious number of Swifts could be better accounted for than by supposing them to come either from the old monastery at Beauly or Inverness, besides leaving their young for a longer period. I immediately requested that one of the shepherds who had most turn for inquiries anent such sort of things might be set to examine whether the Swifts did not occupy the desolate holes of the woodpeckers, and I was gratified by being assured some time after that this was found to be the fact' (William Laidlaw, Ross-shire, *circa* 1835).

Arvicola agrestis (*L.*). Field Vole.

'About the beginning of summer 1832 the shepherds over an extensive tract of the most mountainous district in Inverness- and Ross-shires began to observe that their dogs were killing a more than ordinary number of Field-mice—what they thought the common sort (?).

'They observed that these mice increased as the summer advanced, and that the grass on the drier parts of the mountains, which they chiefly inhabited, was greatly destroyed by them, and as they seemed to prefer the blanched part between the root and the leaves (like as the larvæ of the *Tipula graminea* sometimes does), the withered grass and moss could be rolled off like thin turf. Their numbers were prodigious. The dogs fed upon them, and it was evident the foxes and all carnivorous birds fed upon them. The foxes gave over killing lambs for a whole year, and where a litter of cubs was found in the following spring (1833) it was evident they were supplied with these mice.

'But the most extraordinary fact relating to this singular and unaccountable increase of mice was, that they seemed to leave the district about the month of June following; for few were seen, and the foxes began to destroy the lambs again with greater fury than ever. During the latter part of the summer and harvest not one is to be seen' (Contin, Ross-shire, Nov. 1833).

From the foregoing it will be seen that the Vole Plague, as it is called, was not unknown in former years, and corresponds in most respects with the one that gave rise to so much discussion in the south of Scotland in 1891-92.

'Hundreds of hen Chaffinches on the swathes of the new-mown hay; could not observe a cock amongst them; but there were a few Goldfinches' (Ross-shire, July 20th, 1834).

Mr. Laidlaw saw two Swallow-tailed Gleds on February 16th, 1837 (at Contin), in East Ross-shire.

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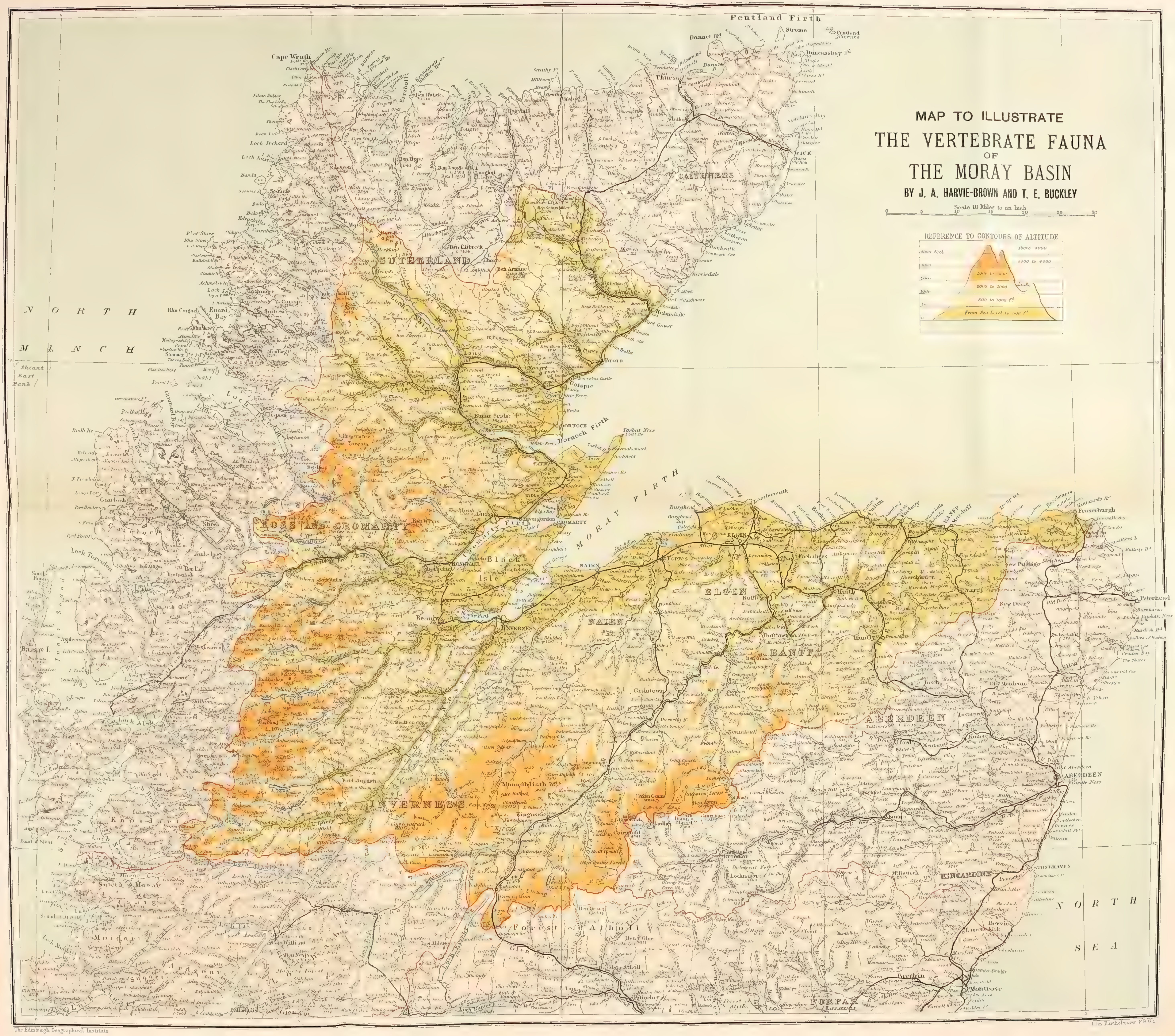

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Scale 10 Miles to an Inch
0 5 10 15 20 25 30
REFERENCE TO CONTOURS OF ALTITUDE
4000 Feet
3000
2000
1000
500
0
above 4000
3000 to 4000
2000 to 3000
1000 to 2000
500 to 1000 ft
From Sea Level to 500 ft
Pentland Firth
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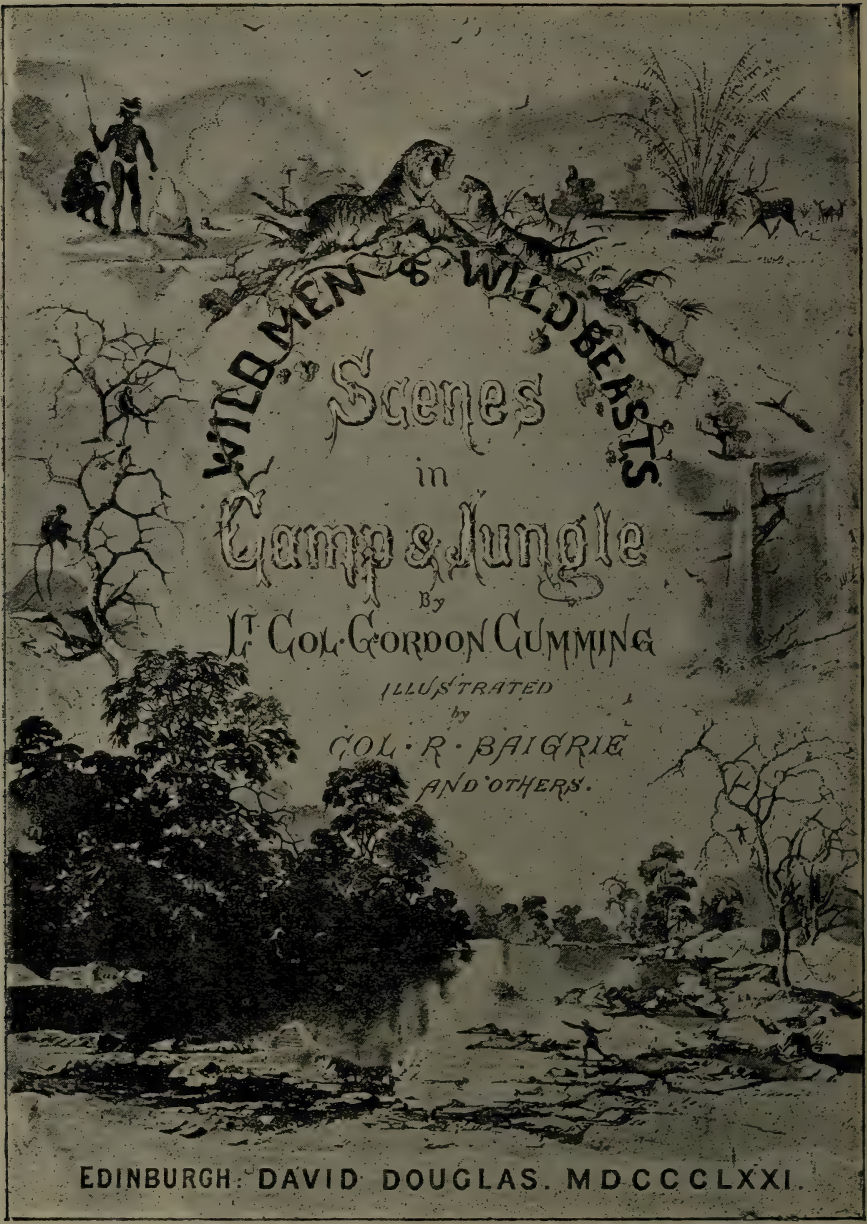

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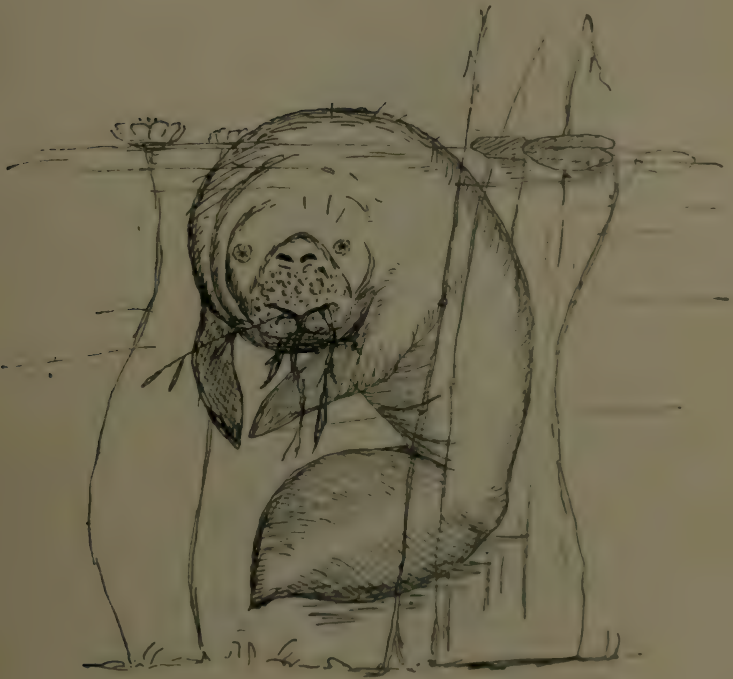

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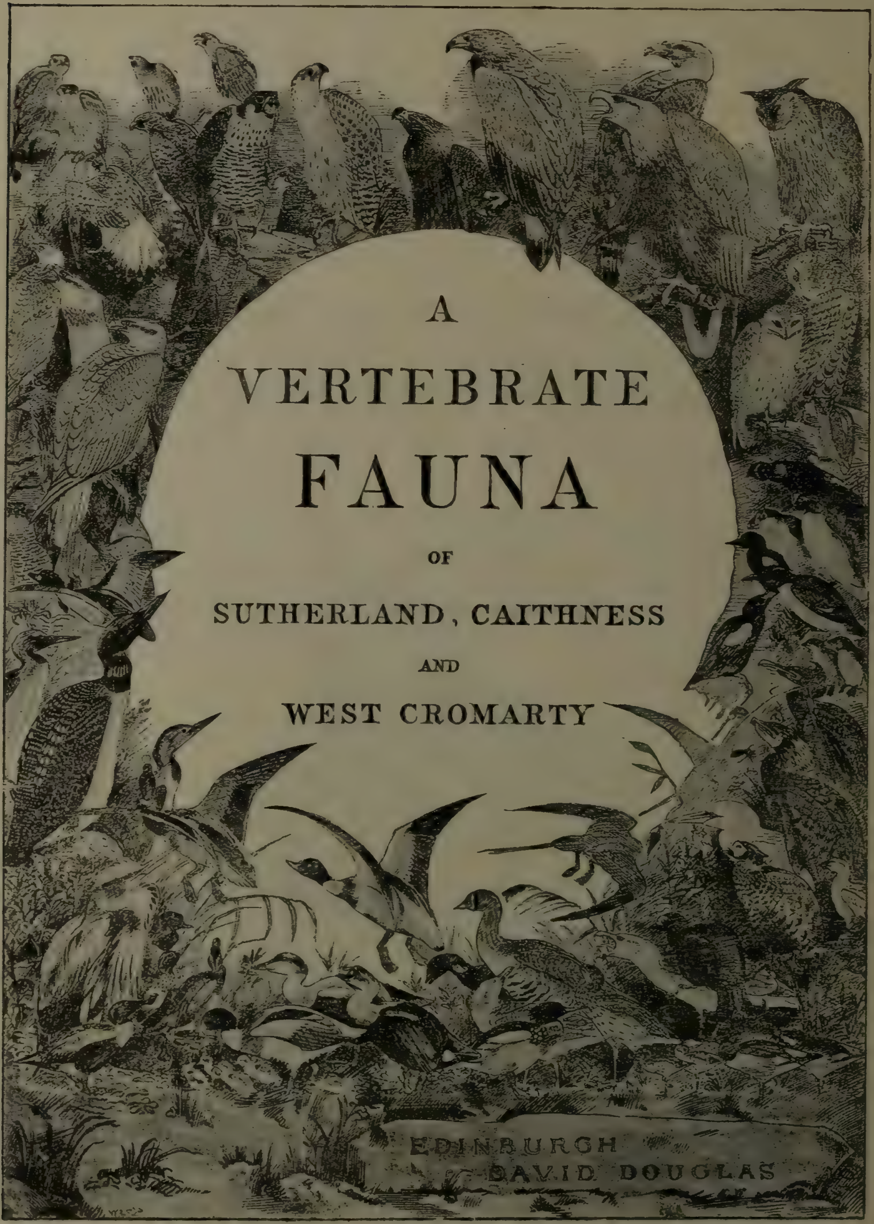

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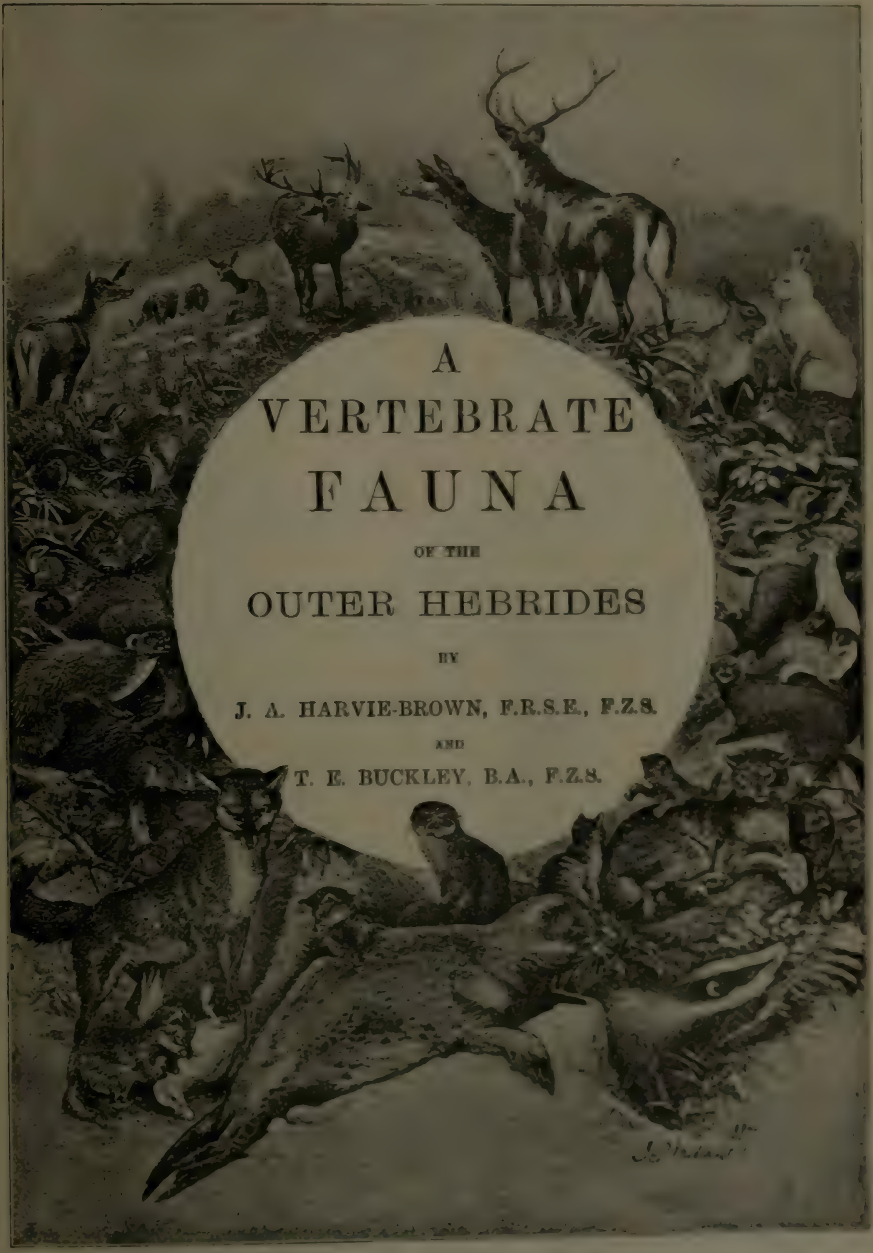

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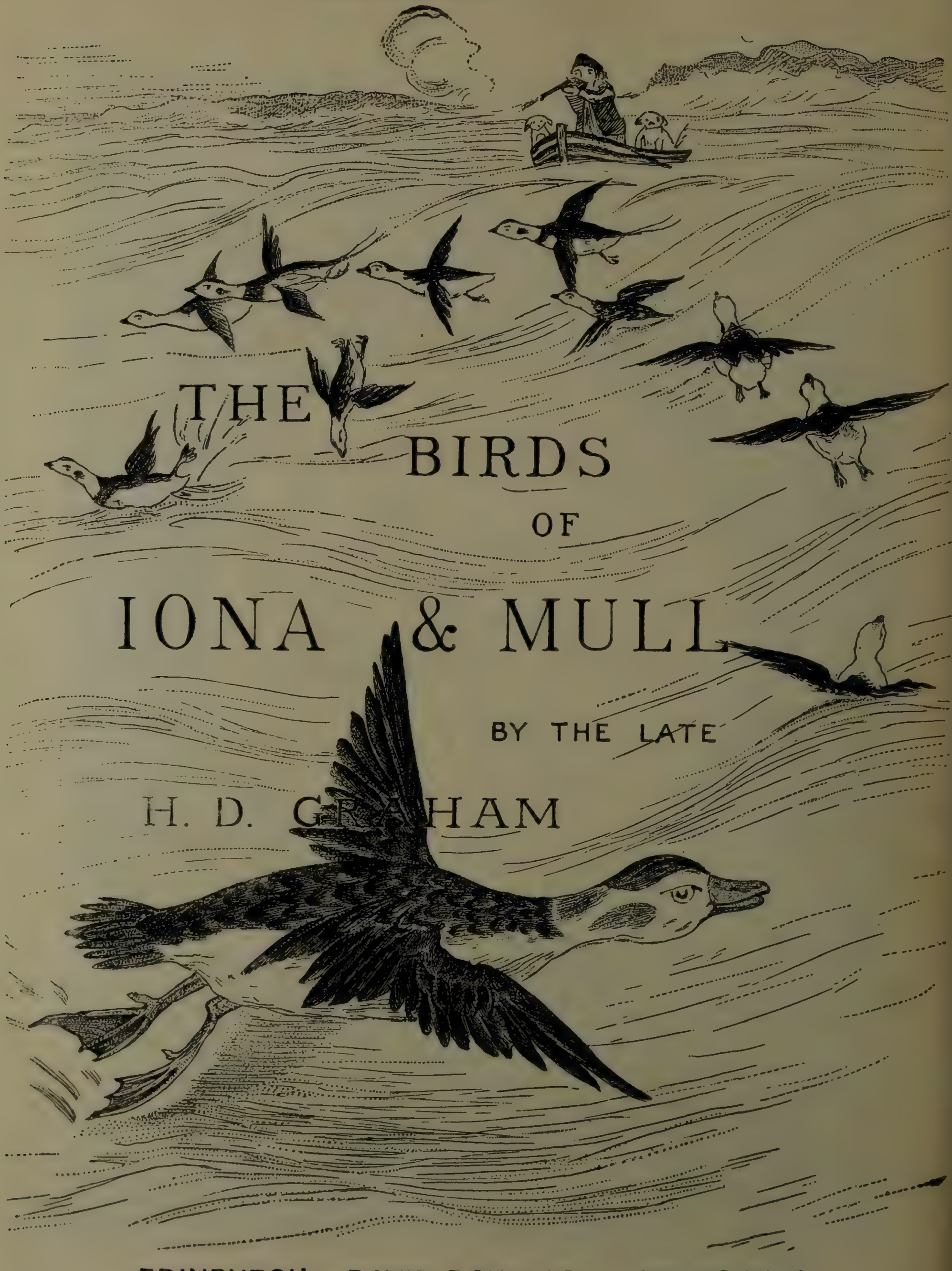

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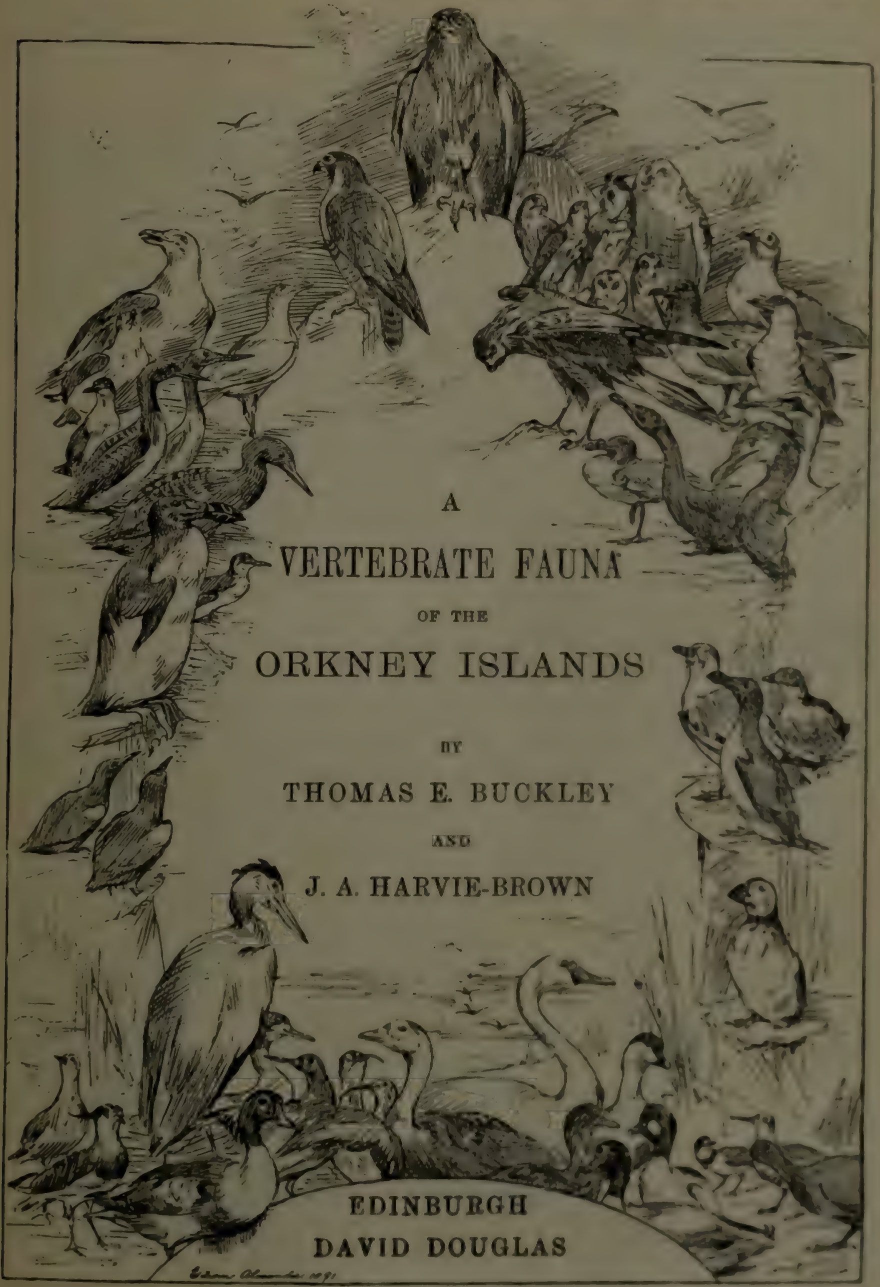

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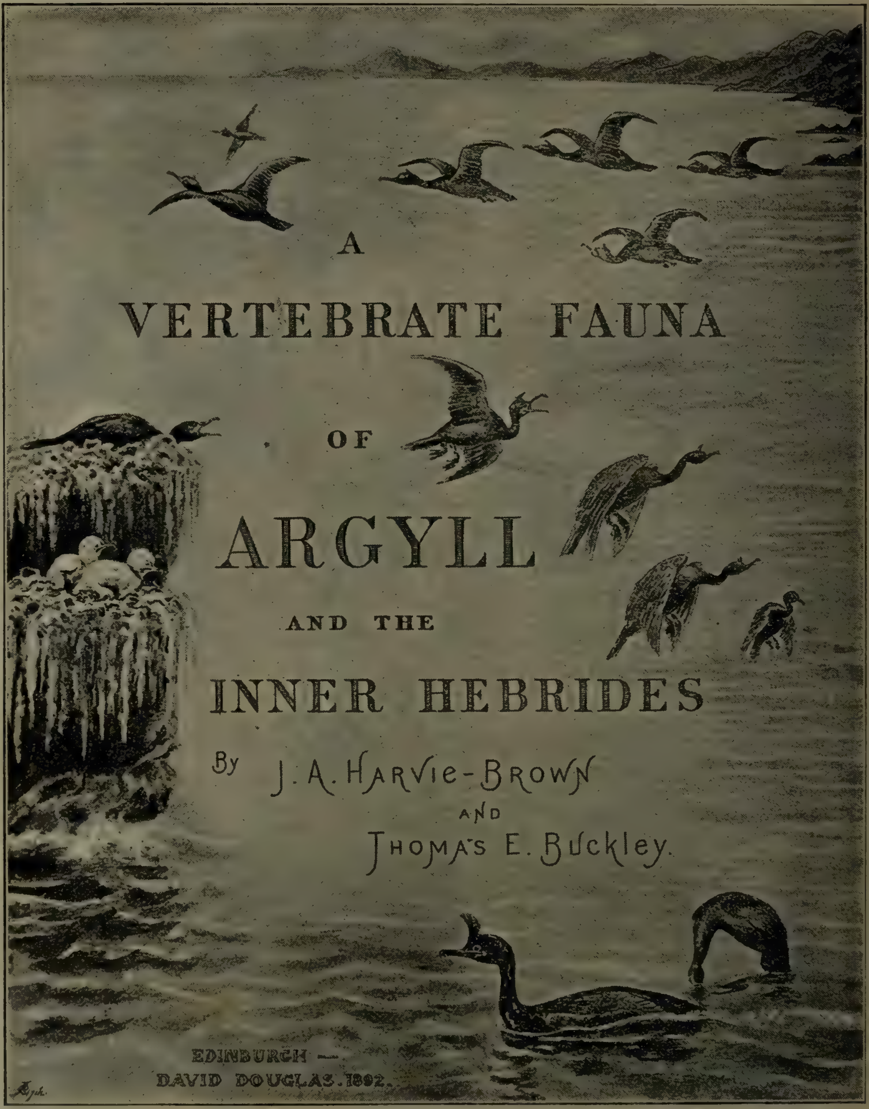

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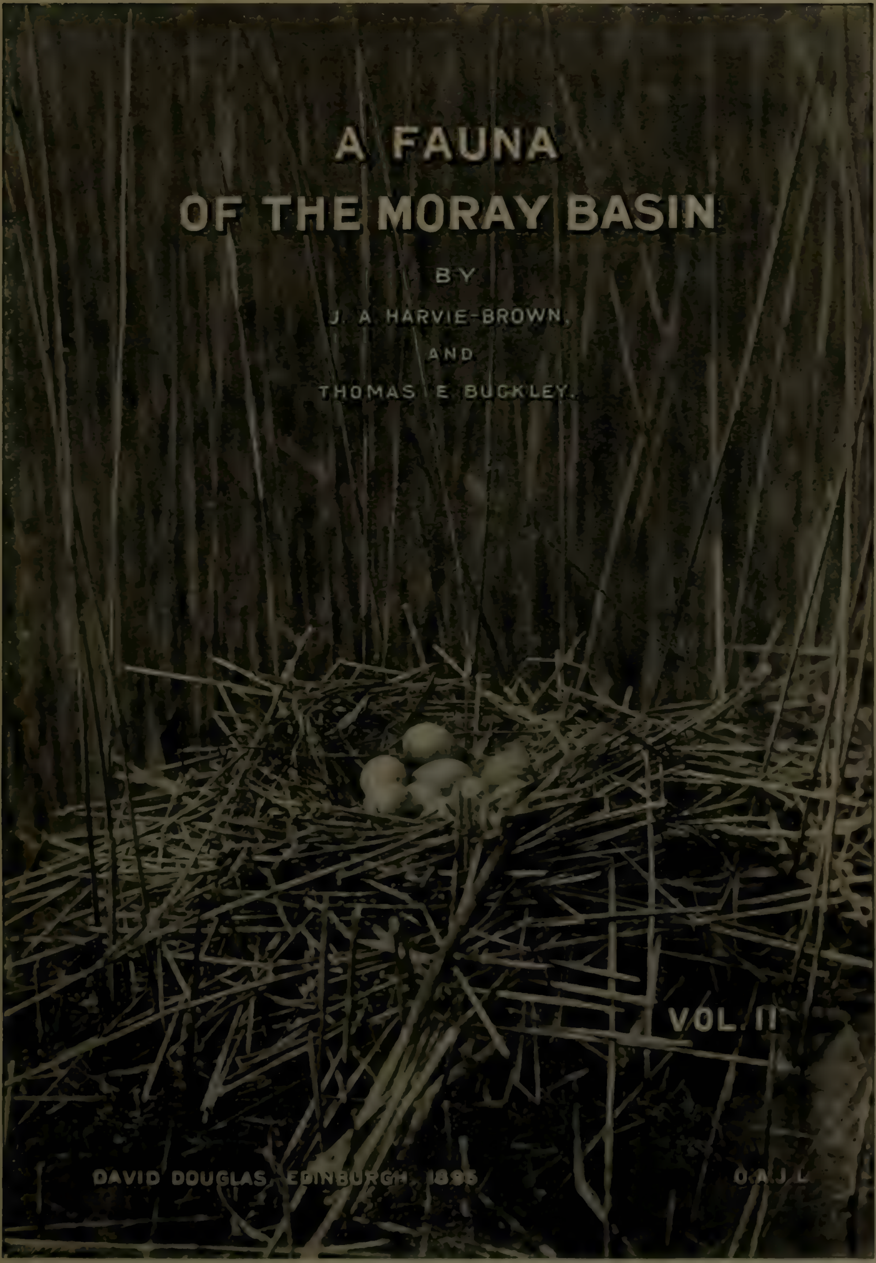

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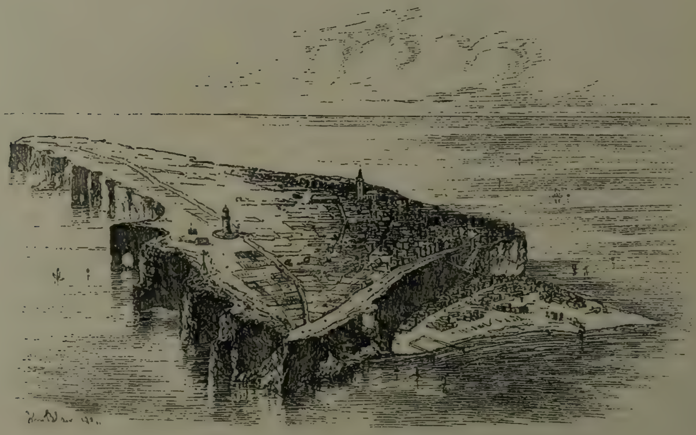

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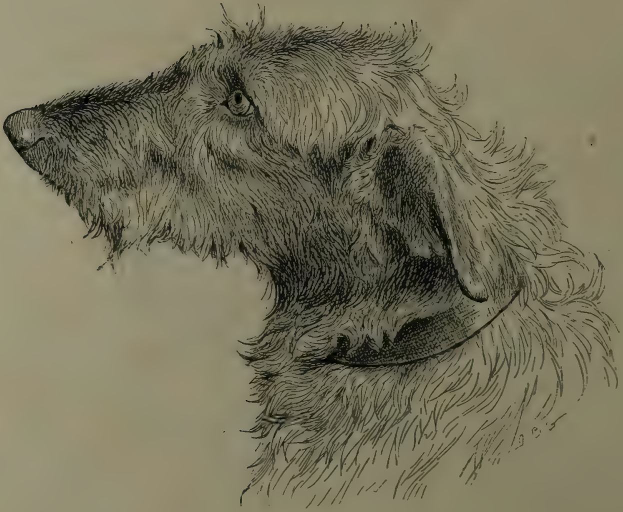

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